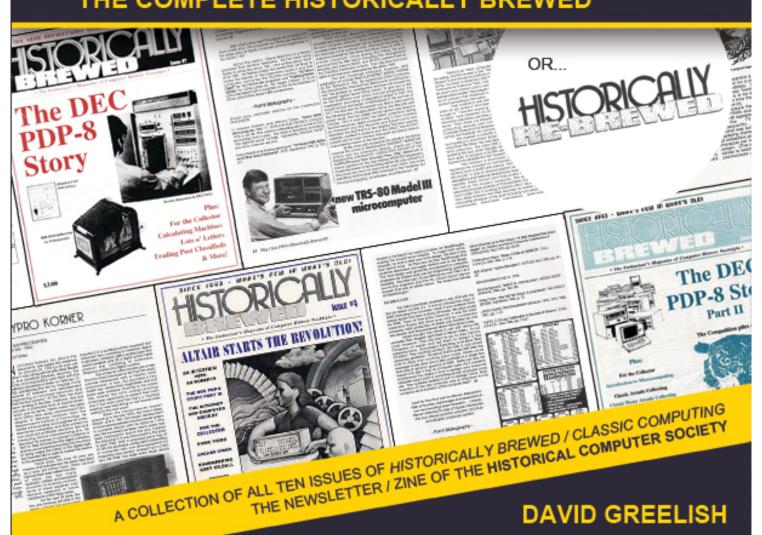


THE COMPLETE HISTORICALLY BREWED



Classic Computing: The Complete Historically Brewed

Historically Brewed Issues 1 through 9

&

Classic Computing
Issue 1

David GreelishClassicComputing.com

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by David Greelish, Computer Historian http://about.me/davidgreelish

Classic Computing

The Home of Computer History Nostalgia

http://www.classiccomputing.com

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This book is dedicated

- to my loving wife Tamara -

She has always been supportive of my hobby and pursuits.

Table of Contents

Forward	5
My Story	6
Issue 1	
Computer Trek	20
Programming Languages Compared	21
The Graphical User Interface	
The XEROX Palo Alto Research Center	26
Book review of Stan Veit's History of the Personal Computer	27
Letters	
The Altair & Cromemco	28
The ZALTAIR & MAAC	30
Issue 2	
Where's Lisa Now?	36
VIC-20 Remembered	
The Computer That Cracked the Enigma	38
more War stories?	
Computer History Trivia	42
Book review of Hackers	43
Letters	43
The Coleco Adam	44
Bill Gates' "An Open Letter to Hobbyists"	46
Issue 3	
The Beginnings of the Apple II Retold - Part I	52
The Art of Computer Collecting	
The Computer Generation	58
Book review of A Collector's Guide to Personal Computers	59
Letters	59
Tidbits for Collectors	63
Issue 4	
Letters	68
The Beginnings of the Apple II Retold - Part II	71
Kaypro Korner - Part I	77
Calculating Computers	79
My First Computer	80
A Problem in the Making	83
Issue 5	
Letters	
The Beginnings of the Apple II Retold - Part III	91
Kaypro Korner - Part II	
Atanasoff's Computer	
Book reviews of The Best of BYTE, Insanely Great & Accidental Empires	95
Classic Computer Emulators	96

Issue 5 (continued)	
Computer History Books	97
Computer Museums	98
Apple Pie	
Issue 6	
Letters	108
MITS' Final Days	113
Kaypro Korner - Part III	115
Canon's Cat	117
Baby Blue	
Merger Madness	
The BREWED Trading Post	
Toys"R"Us Internal Memo	127
Issue 7	
Letters	
The DEC PDP-8 Story - Part I	
Computin' in the Ol' Days	
For The Collector	141
The Calculating Machine	
The BREWED Trading Post	144
Issue 8	4 = 0
Letters	
Computin' in the Ol' Days	
The DEC PDP-8 Story - Part II	
For The Collector	161
Intro to Classic Computing	164
	104
Issue 9	
Letters	
Computin' in the Ol' Days	
A Talk With THE Creator?!	
MITS' 20 Year Reunion	
The DEC PDP-8 Story - Part III	
The Internet	
For The Collector	
The Atari 8-Bit	
The Beginnings	
Remembering Gary Kildall	
Home Arcade Enthusiast	
Classic Arcades	194
Classic Computing Issue 1	100
From the Publisher	
Collecting Classic Computers	
The Alto Computer	
The First Bug	
Computin' in the Ol' Days	
Byte Nostalgia	211

Forward

Every hobby has its stories, and collecting vintage computers is no different. In fact, it has great stories. Some are well known by the general public, like the one about two guys named Steve who launched Apple Computer from a garage. Others are the lore of the hobby—like the political intrigue around the development of MS-DOS or DEC creating the minicomputer and kicking IBM's butt. For every one of these well-known and well-documented stories, unfortunately, hundreds are yet to be told.

And some of those stories might never be told because no one documents them. The computer industry is still relatively young. Old computers are just old computers to most people, even those who work in IT. The historical significance of the computers, technologies, and people is often not understood until many of the details are lost.

Memories fade, documents disappear, and sadly, the people behind the stories eventually die. This is why the launch of *Historically Brewed* in 1993 was both prescient and needed. David Greelish and his contributors started to tell the stories. At the time, the PC was just 12 years old, a few years younger than the Apple II, TRS-80, and Commodore PET computers that you could still find being used in some households. Businesses were still running reliably on DEC PDP and VAX minicomputers.

Yet the computer collecting hobby was starting to take off in the early 1990s. It was fragmented with small clubs, user groups, and online forums that focused mainly on a specialized interest area. There was little that would give all collectors a sense that they were part of a larger community.

Historically Brewed filled that void, and it brought the community together through the stories. Those stories were as varied as the community at large. Microcomputer computer collectors could gain an appreciation of DEC and its PDP-8. Apple fans learned the connection between the Macintosh and the Canon Cat. Articles such as "GUI: The Graphical User Interface" cut across all genres. David complemented the stories with plenty of advice for those new to the hobby.

With the Web, the computer collecting hobby today is a bigger, stronger community than in 1993, but I believe the hobby still needs *Historically Brewed*. While the computers get old, the stories never do.

Michael Nadeau

Author of *Collectible Microcomputers*Classic Tech blog

http://classictech.wordpress.com



Historian – self-made. Thank you for buying my book! Of course it's not entirely *my* book, as many of the articles of *Historically Brewed* were written by other people, but more on that later. I want to start off by telling you a little more about myself, my history, and just how this hobby of mine, my newsletter / magazine / "zine" . . . all got started. It turns out I was a bit of a pioneer, in both computer history nostalgia, and within the zine revolution.

Well, first off, I was born on a warm, sunny Florida afternoon, in a little town called . . . oh wait, that's a little too far back! Fast forward to the fifth grade and my first interaction with the world of computers. I wrote about this in one of my first articles, written for issue one, "Computer Trek." As the story goes, I went on a field trip with my fifth grade class in 1975. We visited the University of North Florida, in Jacksonville, my hometown. We were given a tour of their computer lab facility, but I don't remember actually seeing the computer itself. It was probably locked away in a secure, raised-floor room. The lab consisted mostly of tables where two people could sit in front of what

looked like very large typewriters. These were terminals of course, printer terminals – they didn't have displays (CRTs)! I remember clearly that they had the IBM Selectric balls. When typing out text, they spun around in the carriage in an almost hypnotic way. They printed out on that iconic "green bar" printer paper too! Our teacher and the lab workers got us all seated in twos at the terminals, and only a very low hum could be heard from all of the machines. Suddenly, they all came to life! It was amazing and almost magical how a dozen or so of these big typewriters were typing by themselves at the same time.

If that wasn't impressive enough, they started typing out "Welcome" in large letters by combining ASCII characters. Depending on how old you are, you might remember seeing mall vendors making calendars, t-shirts, and such with video capture photos the same way. I can't remember all of the details now and I don't know if my friend and I took turns typing in our names, but one of the most amazing things happened – the computer asked our names and then typed them out in even larger ASCII letters. It had learned our names! This thing had intelligence and could interact with us! Or so we thought. We spent the rest of our time using the university computer for what it was really meant for – playing Star Trek! It was a text only game, but it was still amazing. From that point on, I remember how significant I thought computers were and I knew, one day, I wanted a job in computer technology. Coincidentally, while growing up watching Star Trek in reruns, I knew that they were to become an integral part of our lives. Maybe one day, we would really talk to them too.

I didn't grow up with a personal com-

puter and didn't get my first hands-on experience with one until college. That was in 1982, in one of the first college courses I selected. It was called "Introduction to Computer Concepts." In the lab, I used an Apple][+ with matching Apple monitor and disk drive. I learned to do some BASIC programming and also how to save / load programs to and from a diskette. It was shortly after this time that I first started thinking about buying a computer for myself. Being on my own by age 19 (in 1983) and essentially poor, I never had enough money to seriously shop for one. Around 1984, I had my sights set on the Commodore Plus/4 simply because I saw it advertised on TV for a clear-out price of \$99. It wouldn't be until my 22nd birthday in 1986 that I received my first computer as a gift, purchased by a very considerate girlfriend. It was a Commodore C64. I loved that computer, even though it was all that I ever had (no monitor, cassette tape or disk drive, etc.). I just used it with my little 13" color TV. I would whip up a BASIC program and mess around for days on it, but I had to leave the computer on the entire time or lose my program!

As a young adult, I always had roommates to save money, but in the middle of 1987, I decided to get my own one-bedroom apartment. All that I had for furnishings was my bed, a small table with chairs, my computer, and a TV. The apartment had glass sliding patio doors in the back and I still hadn't purchased blinds or curtains after living there about two weeks. I worked in a restaurant at night and, being young and naive, went to work one Friday night with both the TV and computer left on. They were both sitting out in the middle of the living room floor. I came home about midnight to find my glass doors smashed in and my TV and computer stolen. My neighbors were having a loud party, with people all over the place outside (I didn't know any of them). Lesson learned, trust diminished, and I grew up a little bit more.

Moving along, but back to 1986, it would be later in that year that I was introduced to the computer that has influenced my life the most – the Macintosh. I had moved to Frederick, Maryland, where I went to college part-time and worked at a computer store called Frederick Computer Products. I was so excited to get that job, as it was my first related to computers. I worked on the retail floor, but the company also had large corporate, government, and educational sales and support departments. It was a successful company, serving the greater Washington, DC and Baltimore areas. We sold IBM, HP, Compag, Epson and Apple computers. This was my first introduction to the full range of personal computing (I was then unaware of the Commodore Amiga and Atari offerings). Though about 90% of all sales were PC / DOS-based computers, internally, we used Macs for just about everything. I was fascinated by the Mac and quickly learned how to use them for proposals, sales quotes, and business letters. I also learned to use a simple networked hard drive (fileserver) and printed documents on the networked Apple laser printer. There was something so friendly and intuitive about the Macintosh, and so I decided that I would never buy anything else. When I worked at the store, the Mac Plus was the top-of-the-line and later the Mac SE was introduced. I aimed for the low-end Mac 512 Enhanced – it was the cheapest model I hoped I might afford some day soon (I had not yet considered that without a hard drive or additional disk drive, the computer would be almost unusable). I purchased some of my first software there too (for my future Mac), including the game *Suspended* by Infocom, in the cool "folio" packaging with the disturbing-looking white face mask. Also while working there, I remember the introduction of the Apple IIGS and how impressed I was with its color graphics and sound, plus I saw the introduction of IBM's PS/2 line (which were not so impressive to me).

By the fall of 1989, I still didn't have my own computer and with more life changes and

some additional moving around, I was now in Gainesville, Florida (where the University of Florida is located). I was still on-fire for the Mac and I got a job with an Apple dealer there called Mini Concepts. Selling them again only increased my desire, so after working there a while, I asked about buying a computer at a discount, but even with that, I couldn't hope to afford one. One day a guy brought in his "Mac" to be serviced; it was odd looking and larger than a classic Macintosh. I looked it over on the workbench and asked our computer technician about it - it wasn't a Mac at all, but an Apple Lisa. I looked through my MacUser and MacWorld magazines and noticed a regular ad from a company call Sun Remarketing. They were selling new, old-stock Lisas that were upgraded to run as Macs! Where it would have cost me about \$1,600 (with discount) for the cheapest Mac system – a Mac Plus with an external 20MB hard drive, I could buy what was essentially a Mac Plus work-alike for \$1,095! I financed that purchase and received my Lisa "new" in the box at the end of December, 1989. My first "real" computer (with a display, disk drive, and hard drive) – my first Mac! Unboxing it, setting it up, and running it for the first time was exciting and wonderful for me. You'll also read more about this in my introduction to issue one.

My Apple Lisa was a key catalyst to my interest in computer history, as my passion for its history blossomed into my interest in the history of Apple Computer, then personal computers, and then computer history in general. Another key catalyst / event that furthered my growing interest happened while in Army training during February of 1991 (after basic training, 12/90 - 1/91). During my first two weeks at Fort Gordon, Georgia, I had to go to the Army Learning Center and watch five different training videos and successfully test-out on them. We had a choice of what to watch within the criteria of the different topics assigned. For technology, I chose a series on personal computing called Bits and Bytes. It was produced

by TVOntario in 1983, so it was already very outdated by 1991, but for me, it was a retro, computer history entertainment fiesta! I loved it so much that I went back later with my girlfriend (who I had met at Fort Gordon, was also in the Army, and would later marry me on June 1st of 1991) and watched it all again! She thought I was a little weird – but still liked me! I've posted the first episode of this great show on YouTube, and I plan to post them all soon. A third catalyst was a gift from my brother Michael. After my training at Fort Gordon, I was leaving for Germany, so I was visiting with him and other family members. We talked about my interests and it turned out that he had a copy of Steven Levy's book Hackers from 1984. This classic explained the true, original meaning of "hacking." I even started making certificates with *The Hacker Ethic* on them when I began publishing *Historically Brewed*:



The Hacker Ethic

Access to computers – and anything which might teach you something about the way the world works – should be unlimited and total. Always yield to the Hands-On Imperative!

All information should be free.

Mistrust authority – promote decentralization.

Hackers should be judged by their hacking, not bogus criteria such as degrees, age, race, or position.

You can create art and beauty on a computer.

Computers can change your life for the better.

It's a great book and I always recommend it. It has three main sections: The True Hackers, The Hardware Hackers, and The Game Hackers. It covers the MIT Tech Model Railroad Club, Homebrew Computer Club, Altair computer, Apple I computer, Sierra On-Line, and more. Hackers really whet my appetite for the stories of old computers and opened my eyes to reading more about computer history. So, I began seeking out other books on the subject. Newly married, my wife and I were stationed in Darmstadt, Germany, where I found a copy of another great book in the Army library, Digital Deli, by Steve Ditlea. Later, I discovered Fire in the Valley by Paul Freiberger and Michael Swaine. These would be followed by many, many more.

After settling into our house in Germany, and having my things shipped over, including my Lisa "Mac," I decided to finally buy a printer (never had my own). I had taught myself desktop publishing at the Apple dealer and I wanted to start printing things. After buying HP's first inkjet printer for the Mac, the DeskWriter, I found that I could not get it to work with the Lisa, though I had researched and read that it could. So, in early 1992, I purchased my first new Macintosh, the Mac Classic, for \$999. As much as I liked the old stuff, I was, and still am, very active in the modern computing scene. I subscribed to both MacUser and MacWorld, plus started buying



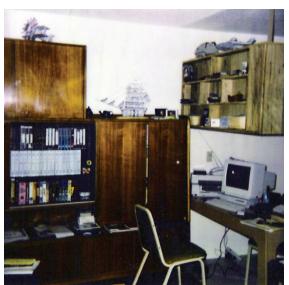
My desk in our house in Germany.

Computer Shopper regularly (loved Stan Veit's column, "What Ever Happened to . . ."), and I was active in the local American Macintosh User Group (in Kaiserslautern, near Ramstein Air Force Base).

Sometime later in 1992, I first started thinking about going "online." I had read about BBSes for years and I wanted to check them out, but I was in Germany (I never did learn how to read or speak much German). I was surprised to find that I could use the American CompuServe service through my German phone with a local number. So I purchased my first modem, a Zoom 2400 baud (a deal at the time for \$99 by mail-order), and I subscribed. I've been "online" continuously ever since. Being connected through CompuServe opened up a whole new world of online interaction to me. I was able to find some Apple HyperCard "stacks" (hyperlinked documents) about computer history, a forum where people discussed old computers, plus the classifieds. It was then that I decided when I returned to the states, I would start a computer club for people interested in computer history and collecting. I could then also start collecting old computers too. Through CompuServe, and while still in Germany, I acquired one of my first old computers. I looked through the classifieds regularly, so one day, I saw someone looking to give away a Commodore SX-64. They wanted it to go to a good home and to be well taken care of, as it had been a very cherished machine. I emailed the man and told him of my plans to start a club, and that I would do my best to preserve the machine in a collection and to show it off in presentations. A few days later he announced that he had chosen me! I was tremendously excited and I offered to at least pay him for the shipping costs, but he didn't want any money. I had him ship it to my mother's house in the states and I got it when we returned shortly after. A very nice touch was that he included a print out with all of the responses that he had received. I was the first one, but also I was the only one who specifically said that I would preserve it as a piece of history. I still have that computer, the print outs, and the letter from him. You can see the SX-64, and hear more of the story in my second video podcast at ClassicComputing.com. I will post the letter and print outs to my blog someday soon too. I also acquired two of my other early collectibles while still in Germany: a TRS-80 Model 4P from my uncle and a 1975 Basic/ Four minicomputer. The owner of the minicomputer came all the way down to Florida in a pick-up truck from Pennsylvania (I'm pretty sure that was the state) and dropped it off at my father's house for me! He wanted it preserved. This was all arranged online, other than talking to my father by phone.

Just before leaving Germany for our next duty station, I started making plans for the club and I named it the Historical Computer Society. I wanted it to be taken seriously and sound distinguished, as my intent was to one day grow it into a full non-profit organization and open a museum. I wrote a press release that I could use to try and get publicity for the club and I came up with the name of the newsletter, Historically Brewed. I named it as a play on words to the Homebrew club / movement. I had also been teaching myself HyperCard, so I created my own stack and gave it out at the last Mac user group meeting that I attended in Germany. It was a Macintosh history stack and it became the basis of my main article for the first issue, "The GUI: Where Did its History Really Begin?" By early April of 1993, my wife and I were settled in El Paso, Texas (Fort Bliss) and she was pregnant with our first child. I started posting the press release about the club and newsletter regularly on CompuServe forums and in the classifieds. HB was to be published every other month – what turned out to be a highly ambitious schedule. A subscription to HB was \$15 a year for six postage-paid issues and with that, you became a member of HCS. At some point in the future, HCS would grow to become a non-profit organization and HB would become a professional magazine as its voice. My first

"member" and subscriber was Stan Veit, from Computer Shopper magazine. He was active in the computer history forum on CompuServe and I was so honored and surprised when he sent me a nice letter of support, with a check for \$15, and a proof copy of his upcoming book! He had opened the second computer store in the world, in 1975 in New York City. The book is one of my favorites and I'm slowly reading it into an audiobook podcast. I received his permission to do so in 2006, before his death in 2010. Within a couple of weeks of regularly posting the press release, I was getting replies of interest about the club and newsletter. I also signed up for AOL (America On-Line) and started posting there too. It was exciting to come home each day from work and answer three, four or more emails of interest. Soon, some other checks and letters started to arrive.



Our first appartment in El Paso.

My next step was to start writing the stories for issue one and then to find contributors for issue two. I ended up having to go out into the "field" for two weeks (training away from the base in Army conditions – tents, etc.) and I wrote the Star Trek article there. Since I was a radio repairer and you need electricity to repair electronics, we worked in a semi-trailer truck and pulled a gas powered generator. I wrote that article on the SX-64 and then printed it to a small Okidata Okimate 10 printer. When I got home, I scanned the article into my Macintosh

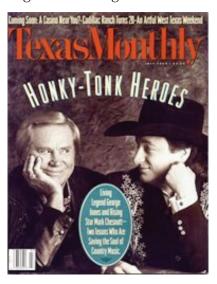
(I had a Performa 400 color Mac by then) and used OCR software to convert it! At the beginning of the summer of 1993, I was ready to start printing issue one (by literally "pasting-up" the printed pages from my computer printer onto master pages and then copying each of them at a Mail Boxes Etc.). I would sometimes be at the copying machine until late at night, manually copying onto each side of the 11" x 17" sheets. If I remember correctly, I had about 30 paid subscribers and sold a dozen or so single copies of the Aug/Sept 1993 issue (one). Just before that issue hit the "press," our first child was born, Addy, who is now 18.



Working in my office, in our house in El Paso.

Letters and checks continued to arrive and the subscription base grew steadily during that first year of publication. I was able to line-up other writers from our readership, as well as from the computer history forums. After issue one, I never wrote an entire issue again. I mostly stayed on schedule, but was always a little late. I pushed back issue four a month, so

future issues would not cross over years (issue three was for Dec/Jan). By mid-1994, my wife Tamara was pregnant again and she decided to leave the Army early (they gave her that option). I decided to not reenlist as well and left the Army in September. We both felt that the job market was too limited in El Paso as we were not bilingual, so we moved to Jacksonville, Florida (Tamara is also from Florida - St. Petersburg). In the little less than two years of living in El Paso and in pursuing my hobby, I had published six issues of HB and had acquired about three dozen or so computers. I also had an office filled with many books, magazines, software and other ephemera. I had been featured in a few articles, with one being a really nice magazine spot in Texas Monthly (see my blog). Wired magazine selected HB



as one of the "Top Ten Tech Zines" for the year 1994 and I was even featured on two local television news channels in El Paso. HB was regularly listed in Factsheet Five, a magazine that reviewed and covered the zine revolution (the publisher contacted me and was a fan of my work!). It was being sold at the Smithsonian's gift shop in Washington DC, at the Computer History Museum in Boston, Massachusetts (now in Mountain View, California), and at the American Computer Museum in Bozeman, Montana. There were about 500 subscribers at that time, with many from other countries! The future looked really bright for HB, which was

improving cosmetically and starting to look even more like a real magazine.

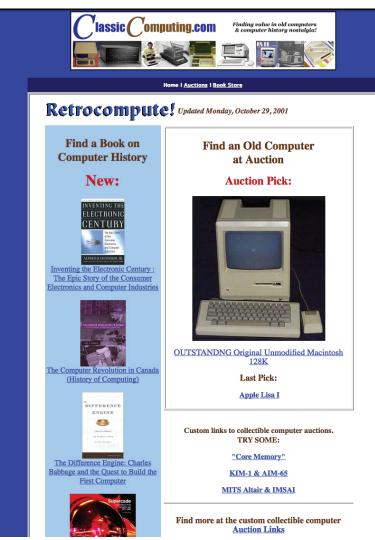
After exiting the Army and moving, we assumed that since my wife had become pregnant while I was still in active service, that the Army would cover the pregnancy and childbirth costs. That was not the case. The Army did not cover us, my wife could not work, and so I worked as much as I could, but we were now poor. Even if we could have afforded insurance, it wouldn't have been impossible to cover her anyway, as a pregnancy was considered a preexisting condition. Life got a lot harder. I don't remember now how long it took to get issue seven out, but it took even longer than it had for issue six. Issue eight was released a good bit after our son Andrew was born on March 20th, 1995. One of the other things that I did after moving to Jacksonville was to self-publish a book containing the first six issues of HB. So there was an HB book that predates this one, and you'll see some ads for it in the later issues. My intent was for it to open up a larger audience for the magazine and to help pay the costs of also printing issue seven. I used a credit card to finance the printing of 200 copies. It sold slowly, and it certainly didn't help us financially (taking a few years to sell them all). We were struggling to just make ends meet, and my dream of making HB into a mainstream magazine, or even a future career, was diminishing. Issue nine came out sometime in early 1996 and I didn't even do a "From the Publisher" column, or put a date on the cover. I didn't want to draw attention to how late it was, or have to make excuses. It was a time of anxiety for me, both personally and about the magazine. I still think issue nine was one of the best issues I ever did, highlighted by a personal interview I conducted with the creator of the MITS Altair, Ed Roberts. He had sold his business in 1977 and moved to a small town in Georgia, where he became a doctor and opened his own general practice. It was about a five hour drive from Jacksonville to go and interview him – a very special experience for me

as a young, amateur computer history journalist. Read the interview in issue nine, and you can also listen to it and read more about his life on my blog. Unfortunately, Ed Roberts died last year, in April, 2010. With issue nine, the run of *Historically Brewed* would stop.

In 1997, I decided that I would try and get the magazine up and running again. I had a good job and I worked extra on the side in order to make ends meet - our household was reasonably stable. I decided to change the name of the magazine so that it could be recognized for its content right away. I thought this could only help its exposure when it sat on bookstore shelves one day. I chose the name "Classic Computing." It was simple, direct and catchy - perfect! I gathered articles for the new issue and began work. I designed a new cover layout too, and made it look more like a mainstream magazine. I created my first full color covers and set it up to print in what is called a four-color-separation. I had however estimated for the cost of the two-color covers that I had previously been printing since issue five. I had the covers printed first, and when it came time to start printing the inside pages, the cost of the covers had already devoured the entire budget run for the whole magazine! They looked great, but I was stymied with the situation. The is-



sue was not completed and as more time went by, more personal financial problems came. Classic Computing issue one would never be and the printed covers remained boxed-up, between my closet and the garage, for years afterward. In mid-1998, I purchased the domain name "classiccomputing.com," but I didn't really know much about creating web pages. Slowly, I learned how to create a basic web presence, but CC issue one still never materialized. With the year 2003, a new child arrived, Jonah, and my computer history hobby seemingly stopped completely.



Classiccomputing.com in 2001.

Over the years, my computer collection has expanded and contracted, depending on circumstances, especially around times when we moved (six more times because of work).

Nevertheless, my interest in old computers, their history, and the people never waned. I would give the occasional computer history presentation at a Mac user group meeting, and I occasionally found old computers at thrift stores or on eBay. I sometimes still bought and sold old computers on eBay too. I did teach myself some basic web design by way of Claris Home Page software for the Macintosh, but I was just never that good with it. My efforts to keep a web page going never really panned out. I had a lot to share, but I couldn't find a direction. That changed in the summer of 2006

when I discovered podcasts through the iTunes Store. On a whim, I did a search for "computer history" and found The Retrobits Podcast by Earl Evans, who had been producing episodes for almost a year. I enjoyed listening to the current episode so much that I went back and started listening from the beginning! I soon discovered 1MHz, The Apple][Podcast by Carrington Vanston, and the Boring Beige Box podcast by Matt Wilson. A little later in 2006 came the *RetroMacCast* podcast with James and John. Carrington and Earl are now my regular co-hosts on the Retro Computing Roundtable, and Matt, James and John have also all been on the show. So podcasts and podcasting really sparked and renewed my creativity in the hobby again. I love podcasts and podcasting, so check it out!

It's still hard to get some of my projects out on time, as my current life is filled with my busy family. I have two teens in high school and one halfway through elementary school. I am however very optimistic

about the future of my hobby and my activities in it.



Working on the *Retro Computing Roundtable*.

I co-host and produce the regular Retro Computing Roundtable podcast (every three weeks), which has essentially become the modern incarnation of Historically Brewed. With the completion of this book, I am back to producing chapters of Stan Veit's wonderful audiobook podcast, and I'll do an occasional video podcast (called Classic Computing). I am working on ideas to make Classic Computing into a three minute package for news programs. Last year, I started up the Historical Computer Society again as a regional club / user group. It had a couple of misfires, but now it's a stable and growing organization. We

have a core group of dedicated members, plus a regular meeting place. We discussed and voted on the name, which is now the Atlanta Historical Computing Society – a nice nod to the original. Its goals are to grow and evolve into a stand-alone, self-governing, non-profit, and educational organization. Maybe one day we can even host an expo for the southeast (I hope)!

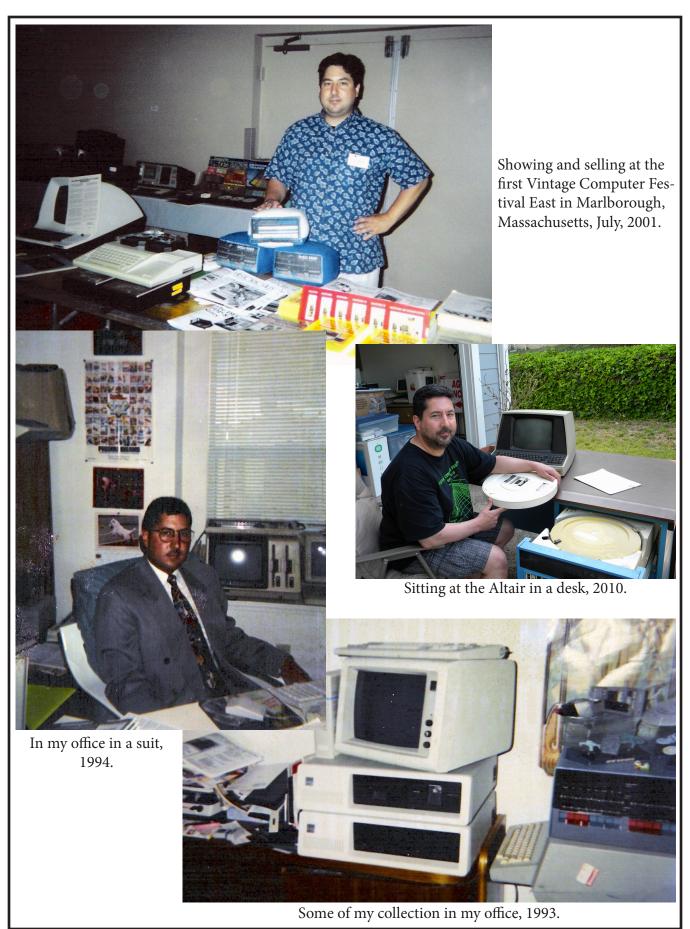
So, that's enough about me, but I hope it gives you a good feel for my past, especially the times surrounding the creation of *Historically Brewed*. These were great issues and contain still-relevant histories of the computers, people and times of our computing past. These stories belong in a quality book, to be held, read and cherished. You're now holding that and I couldn't be more proud! Enjoy it in good health, and please, contact me sometime and let me know what you think about it. - October 2011

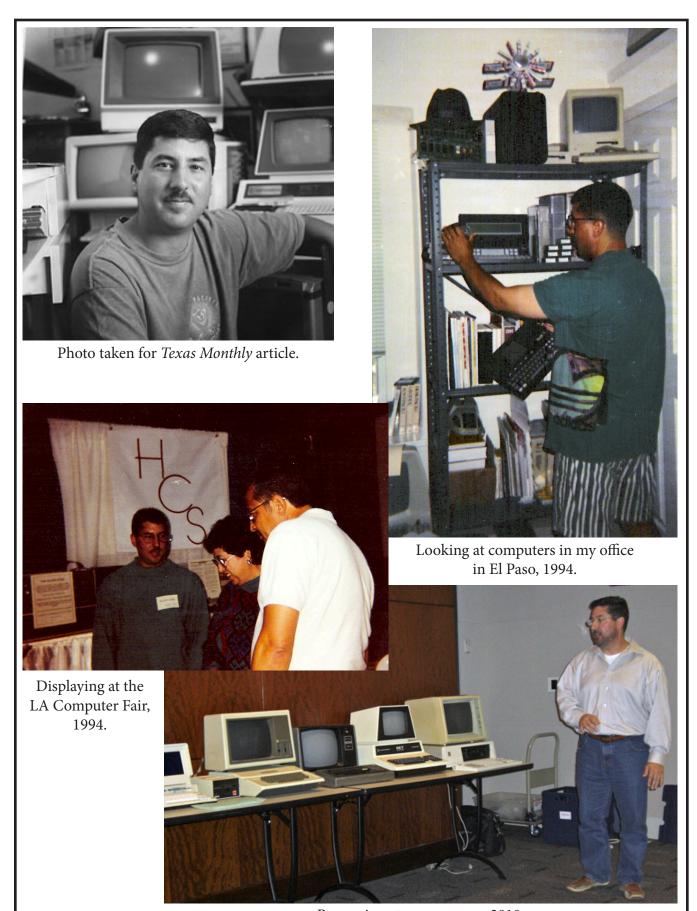


Photo taken for Texas Monthly article.



Photo taken for Historically Brewed.



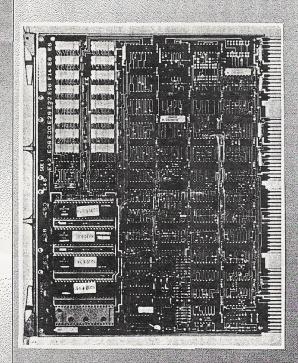


Presenting at a user group, 2010.

HISTORICALLY DE VED Issue #1 Aug/Sept 1993

H_C_S

A Publication of the Historical Computer Society



The
Beginning
of the
Beginnings

THE GUI:
WHERE DID ITS
HISTORY
REALLY
BEGIN?

STAR TREK AND ITS INFLUENCE ON PERSONAL COMPUTERS

A LOOK AT PARC

PLUS:
THE ALTAIR
CROMEMCO
NEW BOOK REVIEW
LETTER PAGE
THE ZALTAIR?

IT'S A FACT FILLED HISTORICAL SMORGASBORD!

Welcome to the first issue of *Historically Brewed*! The Historical Computer Society's Bimonthly newsletter. The

Society and this newsletter have been started in the pioneering spirit of the early computer clubs. One of the most famous groups was the *Homebrew Computer Club* from the San Francisco Bay area started in March of 1975. No other single organization helped to spawn more of today's computer legends than *Homebrew*. This is why I chose the name Historically Brewed for our newsletter. Even with today's impressive technological breakthroughs in computing, the pioneering spirit doesn't seem to be a part of it anymore. HCS hopes to rekindle some of that excitement.

HCS' mission is simple. We are a non-profit organization dedicated to preserving older and classic computer hardware, software and literature while educating and helping our members as well as the public. Historically Brewed is all about personal computer history and computer history in general! In only 18 short years, there is much history to be shared.

I am the founder and President of HCS as well as the Editor of Historically Brewed. I believe in what I am doing and I enjoy it as well. I hope that you too can share in my passion and become involved with HCS. I have plenty of good stories planned for future issues, but I cannot continue to write the newsletter alone forever. Please feel free to submit any computer stories that interest you. It can be about a personal experience or not. We at HCS welcome any comments or suggestions which will help with the success of this group and/or newsletter.

I would like to also tell you a little about myself and how all of this began. I am

29 years old, married, and have a new little girl who was just born on July 20th! (Adeline Nicole or Addy or "Ada-baby" like my wife Tamara calls her.) I was born and raised in Jacksonville, Florida. I have been a Macintosh enthusiast for a while now, but my first computer was a Commodore 64 which I received as a Christmas present in 1985. I only owned the cpu, so all I did with it was to fool around with basic. My interest in computers didn't really peek until I first laid fingers on a Macintosh back in January of 1987 while I was working at a computer store in Frederick, Maryland. I was still fairly new to computers and the Mac attracted me right away. There was something comforting about this cute little computer that was so easy to use. A funny thing about the store I worked in - all of us salespeople mostly sold DOS computers, but we did all of our work on the trusty Macs. I wanted a Macintosh really bad, but I couldn't afford one . . . even with my employee discount (the basic model was around \$1400 and an extra drive was about \$400, Yipe!) I only worked at the store for a few months because I decided to move back to Jacksonville, but my passion for computers and especially the Macintosh had been seeded.

In Jacksonville, I got a job at an Apple dealer working part-time. I was at work one day when an Apple rep brought by one of the original Mac II prototypes to demo. It seemed incredibly fast and I was very impressed. Now color was available on the Mac and I didn't even own a regular one yet. Two years later, I again sold Macs but for a dealer in Gainesville, Florida during 1989 and 1990 while I went to

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college. It was during this time that I finally bought my first Macintosh!

Again, even with an employee discount, I couldn't afford a basic Mac - the Macintosh Plus with a 20 MB external HD: \$1600! But, one day a guy brought in his Mac XL (just like an Apple Lisa computer) for service and I was fascinated by it. I had seen ads by a company called Sun Remarketing in Utah, who were selling original Lisa computers at discounts(the prototype for the Macintosh which Apple sold in 1983 for around \$10,000!) So I bought one from them for \$1095. For all practical purposes it was just like a Mac Plus, except that it had a 12" diagonal screen that I liked better. When it "booted-up" it loaded a program called "MacWorks Plus" that allowed it to emulate a newer Mac operating system. I had no problems using many different Macintosh programs on Lisa. Many games wouldn't work on her though because she didn't have a sound chip. If you tried to play a game that directly addressed the sound chip, the system would crash. That wasn't a big problem because I mostly used the Lisa for desktop publishing.

During the Summer of 1990 I worked for a company back in Jacksonville that was developing a new integrated program for the Mac. I was a beta tester for them and I got the chance to see some impressive Pascal programing done. The software I worked on became what is now known as Symantec's GreatWorks. I also did some beta testing on a

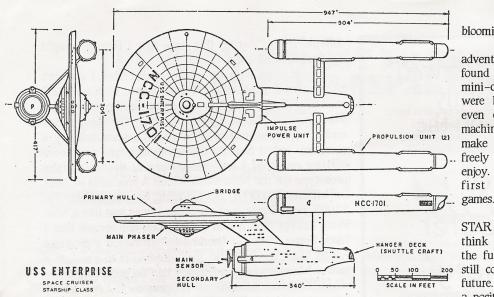
prototype Classic and LC.

In November of 1990, I decided that I needed a change of pace. My beta testing job hadn't turned into everything that I had hoped it to be. What I needed was a stable career oriented job, so I joined the Army! I am now a Radio Repairer here at Fort Bliss in El Paso, Texas. My wife (who I met in the Army) and I just returned from 20 months in Germany. It was overseas that I became more and more intrigued with computer history. I made reading about and collecting old computers my hobby and decided that when we returned to the States, I would try and start a historical computer club. I hope you will help me make it a winner.

Our main story this issue was inspired by my interest in the Lisa and Macintosh's history. The history of *graphical user interfaces* starts much earlier than most people realize. I hope you are enlightened.

David A. Greelish

David A. Greelish CompuServe #100116,217



COMPUTER Trek

by David Greelish

omehow, there has always been a connection between STAR TREK and personal computing. It is one of those things that is difficult to explain, but nevertheless true. STAR TREK's popularity is more apparent today in computing than ever before with a variety of STAR TREK software like games, screen savers, fonts and sounds. There are even STAR TREK mouse pads available. It seems as if a version of a STAR TREK game has been around for as long as computers themselves. Could STAR TREK have influenced the development of the personal computer?

STAR TREK was not a huge success when it originally aired on NBC between 1967 - 1969. Yes, it did have a dedicated following of fans who cried out upon its cancellation in 1969, but it wasn't originally the phenomenal legend that it is today. It wasn't until after the moon missions and syndication that STAR TREK really "took off". This was due to the public's changed perceptions that space travel was indeed not only possible but practical. Since the early seventics,

STAR TREK has only gained more and more fans.

STAR TREK also had a strong influence with the public's perception of computers. It showed that computers would become an integral part of our future. Computers soon would be used in most all aspects of our lives. Also, it taught that this wasn't a bad thing, but a useful tool to make our lives easier and more productive. In STAR TREK, members of the crew only had to talk to the computer to interact with it. That technology is now being used today, though it is not quite as perfected yet.

In the 1960's, computers were still tools of scientists, engineers, the government and large businesses like banks and insurance companies. Normal people couldn't really see a need for owning a "personal" computer. In fact, at the time, the concept of owning your own computer wasn't considered by even people who had access to a computer. The idea of "time sharing" had only just begun. In many universities, students were "hacking" away on terminals connected to mini-computers. Even in STAR TREK there were no individual computers anywhere on the ship, only tie-ins to the central computer. But access is the main theme here. STAR TREK showed that anyone could have access to a computer system. That is the idea that inspired many a

blooming computer pioneer.

By the late '60s, a text adventure of STAR TREK could be found hidden away on almost every mini-computer in the country. There were literally dozens of versions and even different versions for the same machines. Those "hackers" who could make the game better, did and then freely returned their work to others to enjoy. STAR TREK was one of the first and most popular computer games.

What was it and still is about STAR TREK and "computer people"? I think it is an agreed attitude about the future. STAR TREK gave us and still continues to give us hope for the future. It isn't a negative journey, but a positive one. In the future, people of all races and kinds can get together and get along. It isn't a perfect future, but we do not self destruct. The early men and women who helped bring the personal computer into being shared in that vision. The future was bright and everyone can be equal and share in a powerful new tool. The computer should no longer belong to an elite core of persons in white robes and ID cards. Early computer enthusiasts and STAR TREK fans were dreamers.

Within a few months after the introduction of the Altair and the initial release of basic in 1975, STAR TREK found its way to hundreds of users. Almost as quickly as new computers were introduced, the game was transferred over to them. People loved their new dream machines and they wanted to experience the thrill of STAR TREK through them.

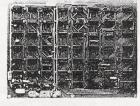
My first experience with a computer was also in 1975. I was 10 years old and in the fifth grade. My class took a field trip to the local university and was oriented in their computer lab. Two and three of us were sat down at what looked like huge typewriters and we waited. All at once the roomful of devices began to clatter away. By using successions of letters, they printed in big letters a welcome to the lab and told us about it. So far I thought it was pretty cool just that the typewriter was typing on its own. What really blew me away though was when the thing asked me for my name. I slowly typed my name in and then the terminal printed it super big - "HELLO DAVID!" I couldn't believe it, the computer had learned my name. I was hooked! After the little introduction, the computer told us (my classmate Thomas and me) that we were going to play a game against it; you guessed it -STAR TREK! It printed a page of instructions with the corresponding buttons and letters for action: firing phasers, firing photon torpedoes, shields up, warp drive, sublight cruising, etc. So we took charge of the Enterprise and encountered a Klingon cruiser on patrol. They of course fired without warning and we were hit a few times. Then we figured out how to use the headings that were given for us and the Klingons. In the end, we still had 70% of our hull left and we completely blew away the bad guys. (A real positive future huh? Maybe I better rethink that one)

It was a great day in my childhood. I kept that printout for at least 2 or 3 years after that. I wish I still had it to look at now. At the time, I always liked STAR TREK, but it wasn't that big of a deal to me. After our trip, my attitude towards STAR TREK stayed at about the same level, but I began dreaming about the future and about using computers one day. I always thought to myself that when I grew up, I wanted to do something that included the use of computers. I guess I've found my niche. In the words of the Enterprise's computer -

"WORKING."

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BASIC
100 PRINT "FAHRENHEIT TEMPERATURE?"
110 INPUT F
120 LET C=(F-32)*5/9
130 PRINT "CENTIGRADE TEMPERATURE:";C 150 END GOSUB PASCAL PROGRAM TEMPERATURE; VAR FAHRENHEIT, CENTIGRADE: REAL; PROCEDURE CONVERT; BEGIN CENTIGRADE := (FAHRENHEIT-32)*5/9; WRITELN ('CENTIGRADE TEMPERATURE IS,' CENTIGRADE) /program prints a conversion table from Fahrenheit to centigrade in steps of 5 degrees, from 50 to 100 degrees Fahrenheit*/ BEGIN WRITE ('FAHRENHEIT TEMPERATURE:');
READ (FAHRENHEIT); int lower, upper, step; CONVERT float fahr, cent, lower = 50; /* lower limit of table */ upper = 100; /* upper limit of table */ step = 5; /* size of steps in table */ step = 5; fahr = lower; while (fahr <= upper) {
 cent = (5.0/9.0) * (fahr-32.0);
 printf ("%4.0f%6.1f\n", fahr, cent); fahr = fahr + step;

Programming Languages Compared

& THE HISTORY OF TODAY'S BIG 3.

BASIC - (Beginner's All-Purpose Symbolic Instruction Code)
Designed by John Kemeny and Thomas Kurtz at Dartmouth College as a learning language which would be "so simple that students could use it after three hours of training." It was originally designed as an interactive timesharing language for mainframes, but became the most widely used language for all sizes and kind of computers.

PASCAL - In 1951, Grace Murray Hopper, a pioneer programmer, wrote the first compiler (a programming tool to construct other programs) which triggered a whole new field in programming languages. A problem arose because there was no order or consistency in the many new languages. Computer scientists all over the world labored to create a standard. ALGOL was born in 1960, but failed as a universal language. PASCAL was named for Blaise Pascal, the 17th century French mathematician and calculator maker by Swiss programmer Nicklaus Wirth in 1971. He took ALGOL and substantially improved it by adding the principal of "structured programming" into the design.

C - In 1963, a group of English computer scientists dreamed up a language called CPL (Combined Programming Language). It was a unique design. It could be machine-independent and easy to use, plus it had features resembling assembly language which allowed a programmer to manipulate individual bits of data. It seemed to be the perfect computer language except for one small detail . . . it didn't work! During the next 9 years, CPL was turned into BCPL and then into just B with attempts to make it into a practical language. It wasn't until 1972, when Dennis Ritchie took a try, that B evolved into today's modern C. Dennis Ritchie wrote the operating system UNIX in C. C is the programming standard today by having just the right combination of high- and low-level programming language functions.

G The U Graphical User I Interface

by David Greelish

The "not as new as you might think" idea that took four decades to really catch on!

Where it All Began

Who created the GUI? Of course everyone knows that Apple Computer invented the graphical user interface and introduced it to the general public with the release of the Apple Macintosh back in January, 1984, right? Oops! Uh . . actually no. Ok, ok, Microsoft invented it with those crappy early versions of Windows? No again. Really, the first practical interpretation of a GUI (you can say "gooey" if you want) should be credited to none other than Xerox Corporation's Palo Alto Research Center (PARC). It was their visionary approach to computing which generated what is today a standard not only with Macintosh users, but also with IBM compatible users as well. In 1971, three years before even the simplest hobbyist computer kits appeared in electronic magazines, PARC had begun work on an intuitive computer which would work like people did in an office scenario. Though Xerox made a graphical

computer "desk top" scenario real, our story must begin with some earlier writings and developments which substantially influenced PARC. Our history begins over forty years ago . .

The Memex Machine

Back in July of 1945, near the end of World War II, a designer of early calculators and a science advisor to President Roosevelt named Vannevar Bush, published an article called "As We May Think" in the Atlantic Monthly. Mr. Bush discussed his concepts of current electronic technology and predicted where the field was headed. At a time when computers were new, huge, and used only by the military, Bush envisioned a computer that would store and manipulate words and pictures, not just numbers. He once said, "The world has arrived at an age of cheap complex devices of great reliability and something is bound to come of He envisioned a smaller device that was designed for personal use. He predicted that one day a computer he called a Memex would, "consist of a desk, and while it can presumably be operated from a distance, it is primarily the piece of furniture at which a person works. On top are slanting translucent screens on which material can be projected for convenient reading. There is a keyboard, and sets of buttons and levers. Otherwise it looks like an ordinary desk."

Bush never tried to build his machine. The technology to bring his ideas to life wouldn't exist for many more years. He was too far ahead of his time. For the next fifteen years, computer engineers refined the technology of room sized, batch fed, number crunching electro-calculating computers.

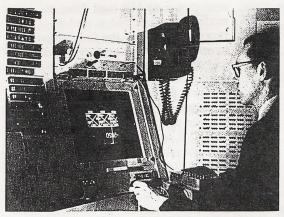
A Personal "Man-Computer Symbiosis"?

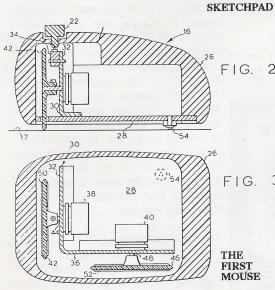
In 1960, a computer scientist named J. C. R. Licklider was chosen to head up a new division of ARPA (the Advanced Research Projects Agency). ARPA was a government funded organization whose researchers asked. "How might computers be shaped to the needs of individual users?" This was an unusual and fresh undertaking for the time. Licklider was to head up the Information Processing Techniques division. Shortly before assuming his position with ARPA, he wrote a paper called "Man-Computer Symbiosis." The paper had many similarities with some of Bush's ideas, but Licklider interpreted the ideal future of computing as a new relationship between man and computer and not just with new types of hardware. He wrote that a person should be able to "think in interaction with a computer in the same way that you would think with a colleague whose competence supplements your own."

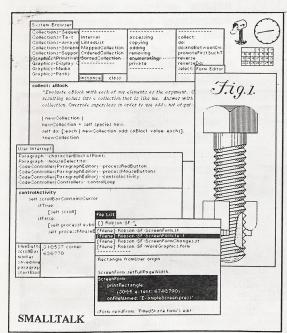
Mr. Licklider was able to turn some of his visionary ideas into reality. He channeled the agency's money into projects which helped make interactive computing a reality. His division developed the concept of timesharing, which allowed many people to share a multi million dollar computer at the same time. Alas, early "hackers" were born as well.

Sketchpad

Around 1962, an MIT graduate student named Ivan Sutherland thought hard about interactive computing. He developed an interactive graphics program called Sketchpad for his Ph.D. thesis. The program allowed a user to manipulate







and directly influenced future about his idea of the perfect concepts of interactive computing.

The NLS

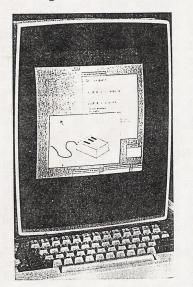
ARPA was responsible for backing the work research program at Stanford Research Institute for exploring FLEX machine. It had multiple augment the knowledge worker." different types of input devices still aimed for a better system. and pointing instruments and form of Hypertext.

The Reactive Engine, Dynabook & FLEX

dissertation about an interactive interactive computing system called "The environment

geometric shapes on a CRT contained many of the general display using a light pen. The concepts which Kay would bring shapes were then treated as to reality with his team later at objects which could be moved, Xerox's PARC. He was interested copied, shrunk, enlarged expanded, in changing the general public's rotated and even joined together attitude about computers. He to create a more complex object, wanted to not only create a This piece of software is the true computer which was interactive, grand daddy of the modern GUI but intuitive. He also dreamed computer called the Dynabook. A computer about the size of a large book, which cost less than \$1000, was easy to use and as also powerful as a mainframe. The Dynabook never came to be, but of a man named Douglas Kay and a colleague named Engelbart, who established a Edward Cheadle did build a stand-alone computer called the the use of computers "to windowing, good graphics and used a pointing device, but was His team experimented with difficult to use and Alan Kay

1970, In Xerox then in 1964, Engelbart invented Corporation opened its Palo Alto the "X-Y Position Indicator for a Research Center and hired Bob Display System," which was Taylor, the current ARPA simply the first mouse. He and administrator, to head the his colleagues also developed an Computer Sciences Lab. Taylor entire system which became hired Alan Kay as one of his known as NLS (an acronym for researchers for the Learning oN-Line System). NLS was Research Group. He also hired unique in many ways. It used a several people who had worked CRT display screen while other with Engelbart on the NLS. This computers used teletypes. It also group of visionaries were had a full-screen-oriented, mouse dedicated to the dream of driven graphical interface which creating an interactive "personal" organized both text and graphics computer. They even coined the into a tree-like file structure. It term "personal computer". In 1971, could be said that it had a crude the center acquired licensing to use the NLS mouse and went to work. Kay knew that the technology to develop his Dynabook was not available, but was determined to pursue the In 1968, Engelbart gave goal anyway. PARC researchers a very interesting demonstration were fond of the saying "The of the NLS at a computer best way to predict the future is conference in San Francisco. One to invent it," and Kay believed, "a of the many people who were personal computer is 90 percent impressed with the demonstration software." In 1972, Alan Kay was a man named Alan Kay, created a new programming Kay, a graduate student at the language and environment called University of Utah, wrote his Smalltalk. It pioneered a complete object-oriented Reactive Engine." This paper advantage of bit-mapped displays, windows, mouse driven input and even multitasking.



The Xerox Alto

Well . . this is the computer that pioneered that "user-friendly" interface that you know and love today.

Developed at PARC (the Palo Alto Research Center), the Xerox Corporation's Alto computer was the first computer to utilize the mouse/icon environment. Designed in 1972, it had 128K of RAM! (As much as or more than most minicomputers had at the time.) It used a bit-mapped 608 x 808 pixel, 81/2" by 11" black on white display screen and a 25 MB removable cartridge disk. It also could be used with a laser printer, plus it connected directly to an Ethernet network. (Where can you get one of these 20 year old computers for your network you say!)

The Alto was primarily created in order to support further software development. Chuck Thacker and another technician built the system in only four months! The Alto was the first computer to not have its interface built into the hardware. The interface could be changed with software. The Alto used Kay's operating system and language Smalltalk and a word processor named Bravo.

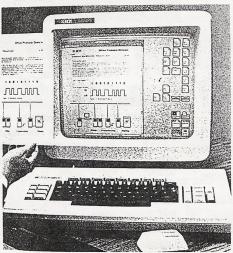
The Alto is arguably the first personal computer. (Though most

computer historians consider the Altair 8800 introduced in late '74 as the first true personal computer kit.) Nearly 1000 Altos were in use by 1979.

The Alto was a giant step ahead in personal computing in the 1970's. It might have succeeded, but it suffered from a very expensive price tag (\$15,000 just to produce it) and a lack of software. Its revolutionary qualities were used to develop other Xerox systems as well as the Xerox Star workstation. The Alto was the computer that could have changed the world – but didn't.

The Xerox Star

The Xerox Corporation formally introduced the "desktop" user interface with the 8010 "Star"



Workstation in 1981. This computer

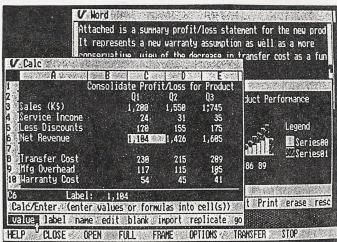
also incorporated the WYSIWYG (What You See Is What You Get) display and printing technology. Basically, the Star was a bigger and better version of the Alto. It had more memory than the Alto with 384K of RAM, a clearer 17" display with a higher

resolution, a 10 MB hard drive, a mechanical mouse and it used 8" floppy disks. It was the first fully integrated graphics based system. It sold for \$16,500 with software. To develop Star and other office systems products, Xerox created the *Systems Development Department*. The Star was not directly developed at PARC.

It was the Star prototype and Alto running Smalltalk that inspired Apple's Steve Jobs to start the Lisa project at Apple and caused Bill Gates to consider "Windows" at Microsoft near the end of the 1970s. Steve Jobs had seen the Star demonstrated while visiting PARC. He was able to talk some of PARC's key engineers into coming over to Apple to work on the Lisa and Macintosh projects. Much later, after the success of the Macintosh, Xerox sued Apple for stealing their ideas about graphical interfaces. It was ruled that an idea or concept could not be copyrighted. Pretty good for Apple huh?! Yet Apple went on to sue Microsoft for doing exactly the same thing! Apple contested that Microsoft had stolen their "look and feel".

The Graphical Fury of 1982

At the 1982 annual Fall Comdex convention, a new and unique software product was demonstrated to the general public called VisiOn. Produced by VisiCorp, the creators of VisiCalc, VisiOn was an integrated set of graphically oriented applications. It used a mouse,

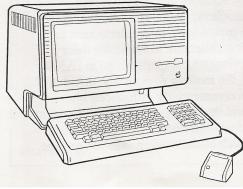


did windows and WYSIWYG highresolution graphics. It more than amazed thousands of convention goers and even awed Bill Gates of Microsoft. This led him to start development back at the shop on the "Interface Manager" which later became Windows. "Enter VisiOn. Suddenly and without warning, your personal computer becomes everything you actually bought it to be," is a quote from an ad in February 1984. But VisiOn was still just a demo in 1982. It wasn't until late '83 that the software became available to consumers. VisiOn didn't succeed because it cost nearly \$1,800 by itself and needed an XT with a hard drive and 512K of RAM in order to run. These were tough requirements in 1983. Other unsuccessful entries into the GUI arena were DESO by Quarterdeck Office Systems and GEM by Digital Research.

The Apple Lisa

Introduced in February 1983, the Lisa computer received quite a fan-fare from electronic and computer magazines. It was hailed as the next generation in ease of use. Though most of its interface was "borrowed" from Xerox; the Lisa did a lot to improve on the basic concepts as well as introducing the one button mouse and the first integrated application software.

The original Lisa computer had a full "meg" of RAM, 16K of ROM and two 525" "twiggy" drives. It used a 5 MB external hard drive called the "Profile" which sat up on top of its case. The screen was 12" diagonally with 364 lines by 720 dots per line resolution. It is interesting to



mention that the Lisa had rectangular pixels instead of square ones. The Lisa can be somewhat considered the prototype for the Macintosh. Its operating system was not quite as refined as the Macintosh, but the Lisa's ROMs did contain a lot of the code that was later to be used on the Mac. Like the Mac. Lisa also used a Motorola MC68000 microprocessor running at approximately 8 MHz. The second generation of Lisas which were released shortly before the release of the Mac were known as Lisa2s. They had a 400K single sided 3.5" disk drive and an internal 10 MB hard drive.

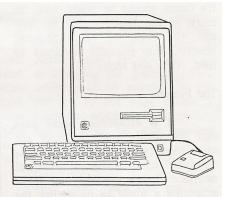
The Lisa did have a small excited following for a short time, but it was apparent that its \$10,000 price tag made it too impractical for even serious corporate buyers. These events occurred almost two years after the introduction of the IBM PC which cost about three times less.

Almost immediately after its introduction, Apple kicked the Lisa to the sidelines to better continue work on another project – A computer for the rest of us with all the features of the Lisa for around \$1000. (It didn't happen!) Around early 1985, Apple renamed the Lisa – the Macintosh XL. It was sold with a program called "MacWorks" which allowed it to emulate a Macintosh. Sales were fair.

The Macintosh

Formally introduced in January 1984, the Macintosh received a huge response from its Superbowl half-time television ad. In the ad, "Big Blue" (IBM) was made out to be like Big Brother from Orwell's novel 1984. The "computer for the rest of us" had arrived to set us free.

The original Macintosh had 128K of RAM. It used the Motorola MC68000 chip running at approximately 8 MHz. It had 32-bit internal registers and a 24-bit address bus. It had 64K of ROM, couldn't use a coprocessor and the memory was not upgradable because it was soldered directly to the motherboard. It had a unique cabinet design; a semi-portable,



box-like, self-contained unit with a built in 9" black on white 512 by 342 pixel display. One 3.5" 400KB disk drive, two serial ports and a four-voice sound generator. A one button mouse and a 94 key keyboard. Macintosh came bundled with two software packages called MacWrite and MacPaint.

The Macintosh became a very popular computer almost immediately. Apple had hoped to sell 50,000 machines within the first 100 days, but dealers moved more than 75,000 Macs during this time. (Most at the full \$2,495. list price) The Macintosh wasn't taken seriously by business users and never approached IBM's lead, but it did define ease of use and became the standard for GUIs.

By the Mac's first birthday in January 1985, roughly 70% of Apple's revenue was still coming in from the Apple II line. Mac sales had slumped, but just in time, Apple introduced the LaserWriter. "Desktop Publishing" was born and the Mac was saved. This is the area where the Macintosh defined another standard.

Windows & OS/2

Well . . what can I really say about the history of these products? Until relatively recently, neither was widely used or taken seriously. But now, Microsoft Windows 3.1 is the standard of DOS based GUIs. At least 70% of all new software is being written for Windows.

IBM's OS/2 2.1 (co-developed by Microsoft) is finally making a serious grab at the market. Hailed as the only true 32 bit DOS operating system, it is a far second to Windows.

It's future should be bright with the entry of the Pentium chip by Intel and the soon to be introduced PowerPC chip mutually developed by IBM, Apple and Motorola.

The Future

It is established these days that the future holds more of the same. Most typical home and business computer users prefer a graphical interface. These systems just make computing a whole lot easier. But, the original concept was "interactive" computing and not just graphical. These goals are being pursued in numerous research facilities all over the world. In fact, it is not unreasonable to expect practical voice and writing recognition systems on the market by the end of the year. The next wave of personal computing of pen-based era the communicators. Is the Memex here yet? How about the Dynabook? Have you seen one?

8K STATIC RAM

Part no. 300

• 8K Altair bus memory • Uses 2102 Static memory chips • Memory protect • Gold contacts • Wait states • On board regulator • S-100 bus compatible • Vector input option • TRI state buffered • Board only \$22.50; with parts \$160.00

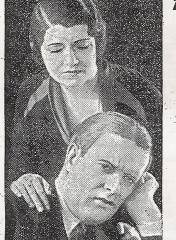
RF MODULATOR*

Part no. 107
• Converts video to AM modulated RF, Channels 2 or 3. So powerful almost no tuning is required. On board regulated power supply makes this extremely stable. Rated very



highly in Doctor Dobbs' Journal. Recommended by Apple. • Power required is 12 volts AC C.T., or +5 volts DC • Board \$7.60; with parts \$13.50

Watch Your Husband!



for the first Signs of NERVOUSNESS

It has been said a man's success depends more on his wife than any other one factor. The "successful" wife watches her husband's health like she does that of her children. At the first sign of Nervousness or Irritability—the wise wife suggests Dr. Miles' Effervescent NERVINE Tablets.

When your husband comes home weary and despondent—when he is troubled with Nervous Headaches, Sleeplessness or Nervous Indigestion, try Dr. Miles' Effervescent NERVINE Tablets. They make a sparkling, refreshing drink that quickly soothes over-

wrought nerves. They will soon make him feel his happy, goodnatured self again.



25c and \$1.00 Packages.



The XEROX Palo Alto Research Center

PARC was established in 1970 by Xerox to compliment its main research facility at the time, Webster Research Facility in New York. The new center was designed to expand Xerox's role beyond reprographics and into information handling and communications. It would provide the technologies for the company's future office information products. Peter McColough, the president at the time, wanted Xerox to expand and become the "architects of information" for the business office. PARC has focused its work on how to make managing information more convenient and effective for users.

PARC occupies a 200,000-square-foot facility in the Stanford University Industrial Park in Palo Alto, California. It was located near Stanford University in hopes that it would attract outstanding technical talent.

PARC founders believed that modern information technology would be built on both the information sciences and the physical sciences. Staffed with nearly 250 researchers, PARC has talent ranging from computer science technology to psychology, microelectronics to programming languages, and network architecture to linguistic theory.

Numerous concepts and achievements have originated at PARC. Among them was the development of the modern workstation on a fully distributed network. These computers commercially introduced bitmapped displays, windowing, icons and the mouse. Related development included Ethernet, now an industry standard. No other private research center anywhere has contributed as much to the modern information age as Xerox PARC.

Book Review

Whatever Happened to the Classics?

Stan Veit looks back on his years running the Computer Mart of New York.

"From Altair to IBM," Stan Veit recollects about the machines he sold and the people he met in his store from the mid to late 1970s. He also covers computers of the early '80s and tells the story of IBM's introduction of the PC in 1981 and what happened to the competition. It is an interesting and personal account of the developmental years of personal computing.

STAN VEIT'S HISTORY OF THE PERSONAL COMPUTER

by Stan Veit, Editor-in-Chief Emeritus of Computer Shopper

\$19.95 soft cover & \$27.95 hard cover

WorldComm 65 Macedonia Road Alexander, NC 28701 1-800-472-0438

Actually, the book is an expansion of his articles from the Computer Shopper where he has a monthly column entitled What Ever Happened to -. It is a collection of individual short computer stories. This is nice because you can jump around and read about the computers which interest you most first. You will get around to reading them all though and not one is uninteresting. The facts are straight forward and Mr. Veit presents technical information in a way that does not intimidate nor insult. But the exciting portions of his book are his interactions with the people in his store and some famous people who he met and worked with. He met and helped Steve Wozniak and Steve Jobs with their early Apple and Mr. Veit's wife even forced Steve Jobs to let her patch a hole in his jeans at a show! Charles Tandy paid a visit to the Computer Mart as well.

This book is a must for the computer history buff. Stan covers - Altair, IMSAI, SWTP, Sphere, Apple, Cromemco, Ohio Scientific, Processor Technology, the digital group, Radio Shack, Commodore, Atari, T.I., North Star, Osborne, Vector Graphics, Polymorphic, Heath, Morrow's, Xitan, IBM and some others you may have never heard of!

Letters Page

OK, so it's not a whole page and we only have one letter to print, LOOK quit harassing me and get those letters in now! We want to hear from you. Send to:

HCS Letters 10928 Ted Williams Place El Paso, TX 79934

Dear HCS,

My association with "antique" computers has been somewhat brief so far: In May 1992, I bought a Kaypro II at a flea market. Soon after I procured the software and documentation I needed, the machine malfunctioned. After trying to fix it myself, I shipped it off to Florida to an expert who proclaimed it dead (the main board was cracked).

Meanwhile, my employer went bankrupt, and during their liquidation, a 1984 IBM AT became available to me, replete with a truckload of software and extras, and thus began my migration from CP/M to "classic DOS".

In a time when the public is being bamboozled into believing that they must spend all their cash on blindingly fast, giga-memory, multi-media behemoths in order to achieve the PC equivalent of "keeping up with the Jones!", it is refreshing to find organizations that recognize (1) how relatively useless these beasts are to the great majority of users (sans CAD-artists, aerospace engineers, and the like), and (2) that the older, basic nuts-and-bolts type machines, marketed in their time as "personal business computers", can accomplish virtually the same tasks, albeit a few microseconds slower (who cares?) and sans all the bells and whistles.

It is also refreshing to hear this old iron referred to as "antique" as opposed to outdated junk. Why shouldn't old computers achieve the same classic status as other articles of America's past?

Sincerely,

Erroll Foldes Briarwood, NY

Antique Parlor

The Altair

Leslie (Les) Solomon was the Technical Editor for *Popular Electronics* during the summer of '74 and he was looking for a good computer article and project to print. Both he and Editorial Director Arthur Salsberg wanted to publish a piece on building a computer at home. Soloman had received some articles, but they were not what he was looking for. "A rat's nest of wires," as he would describe them. But Solomon encouraged his writers to send in their best ideas.

Ed Roberts was one of "Uncle Sol's" writing contributors. A man who loved to fool with gadgets and electronics, Roberts started a small electronics company in Albuquerque, New Mexico in 1968. MITS (Micro Instrumentation Telemetry Systems) mostly sold radio transmitters for model airplanes through the mail. But, by the early 70s, MITS was selling calculator kits and doing fairly well.

At the end of 1973, the calculator market changed drastically, other companies were selling fully assembled calculators for below \$50, while Roberts' kits were \$99.95. He had to think of something quick or go broke. He had toyed with the idea of developing a computer kit before, but never followed up on it. Now, he decided to go for broke. If this didn't work, then he would just close up shop.

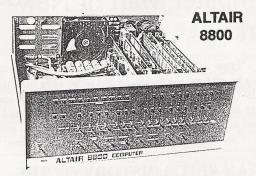
Roberts decided on the Intel 8080 chip for his project, rejecting the older 8008 and new 6800. He was able to get an excellent deal on the chip in volume - \$75 a piece for a \$360 chip! By mid-1974, Solomon had decided on supporting Roberts' article and kit. He staked the reputation of *PE* on the expertise of MITS. In July 1974, *Radio Electronics* had published an article on a 8008 based computer kit called the "Mark-8". Les Solomon needed an 8080 based project to beat out *RE*.

MITS worked feverishly on the computer, creating an expandable main circuit board that had a data bus with 100 separate paths. It was capable (in a miniature way) to do anything that a large mainframe computer could do. Les Solomon's daughter, Lauren, gave it it's name "Altair" because that was where the Enterprise on STAR TREK was going that night. He had asked her for a name idea and had asked what they called the computer on STAR TREK? "Computer," she said. Altair was the better name.

The Altair kit appeared on the cover of the January 1975 issue of *Popular Electronics*. In kit form, MITS offered the basic model with 256 bytes of RAM, standard binary switches and LEDs on the front panel and power supply for \$400. Hoping to sell around 200 kits, Ed Roberts and MITS were overwhelmed to receive thousands of pre-payed orders. Electronic hobbiests were willing to have paid the

\$360 just for the chip itself, so why not get an entire computer for \$400? It took MITS almost a year to catch up the orders. Over 10,000 Altairs were sold by MITS.

The Altair was the first commercially successful computer ever. It started the personal computer revolution which has since consumed our planet. Imagine the world just 18 years ago when there wasn't a computer in every pot.



Cromemco

They were the "Specialist In Computer Peripherals." Known for reliable and useful products, Cromemco was started by two Stanford University graduate students named Harry Garland and Roger Melen. They had been two of "Uncle Sol's" contributors for *PE*. One morning in 1975, they were visiting Solomon and showing him their newest project called the "Cyclops" TV camera. Les Solomon showed the two men the Altair and they were hooked on computers forever more.

On there way back to California, Garland and Melen stopped by MITS HQ. They convinced Ed Roberts that they were just the men who could develop a video board for the Altair. Though considerably backed up with orders, Roberts allowed them to take an Altair. Thus, Cromemco was born - named for their beloved dormitory at Stanford, Crothers Memorial Hall.

Cromemco's first product was an excellent plug-in EPROM board (Erasable Programmable Read-Only Memory) called the "Bytesaver". It cost around \$200 in kit form. Their next endeavor was a graphics board called the "Dazzler". The Dazzler could send a vector-generated color signal to a standard color TV set. They also sold software to take advantage of this wonderful new product. One of their most impressive wares was called the "Kaleidoscope" which looked like a rotating color kaleidoscope on a color TV. It was a work of art at a time when computers used teletypes.

Cromemco continued to expand its product line

with Altair compatible S-100 plug-in boards and developed a Z-80 CPU board. The next step was to complete an entire computer. The two men bought an IMSAI computer (an improved Altair compatible) and installed their own ZPU board, I/O boards and memory boards. The computer performed noticeably better and they called it the Z1. The Z2 was Cromemco's first totally in-house produced computer. It had a large, extremely sturdy medal case, Z-80 CPU, shielded S-100 bus and 21 expansion slots. You could even purchase an 11 MB hard drive for it.

Throughout the 70s and early 80s, Cromemco continued to expand and improve their computer and peripheral line. Cromemco was one of the last S-100 computer manufacturers to fall to IBM. IBM's entry into the personal computer market in 1981, destroyed many of the earlier non-DOS machines.

- Historically Brewed Classified -

For a limited time, we are offering free classified advertising for <u>subscribers</u> of *HB*. Size of ads are left to the discretion of *HB*. Ads can be of a business nature, equipment for sale, trade or contacts. Send to: *HCS Classifieds* - 10928 Ted Williams PL - El Paso, TX 79934.

Please enjoy these reprints of classified ads from a computer magazine of 1983.

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FREE SOFTWARE DIRECTORY. Database manager, mailing list, inventory, accounting, payroll. TRS-80, xerox, IBM-PC. Long SASE. 37¢. Micro Architect, 96 Dothan, Arlington, MA 02174. 617-643-4713.

VIC-20 TRS 80 SOFTWARE, HARDWARE—Morse code, RTTY, EPROM, programmer memory. FRANK LYMAN, P.O. Box 3091, Nashua, NH 03061.

ATARI, APPLE, IBM-PC: Extensive line-educational, entertainment, business. FREE BROCHURE. New Dimension Software, 39010 Baroque, Mt. Clemens, MI 48044

TI-99/4A PROGRAMMERS: Affordable Software! Catalog, only \$1. PROGRAMS SOFTWARE, 1435 Burnley Square North, Columbus, OH 43229.

GUARANTEED LOWEST SOFTWARE PRICES FOR ALL SYSTEMS! Write for quotes and FREE CATALOG. Specify systems. N.Y.S.E., P.O. Box 722, Newtown, PA 18940.

TI 99/4A SOFTWARE. Free price list plus newsletter. Glen Dobbs, Box 801CC-1, Santa Maria, CA 93456.

VIC-20/COMMODORE-64 Educational Software designed by teachers. Free catalog. ATHENA SOFTWARE, 727 Swarthmore, Newark, DE 19711.

ATTENTION; TI99/4A; SINCLAIR TS/1000; COMMO-DORE VIC-20/64; APPLE; ATARI 400/800 USERS! Super Software Selection. Send \$1.00 for CATALOGUE. State make, model. Alpha Software, 162 Chapel Drive, Churchville, PA 18966.

ULTIMENU FOR DOS simplifies IBM's, PC-DOS to meet your needs. \$24.95. DB/DC Software Associates, P.O. Box 4695, Manchester, NH 03108.

TI-99/4A owners. Send for free list of new and exciting, low cost software. DYNAMO, Box 124, Hicksville, NY 11801.

CHECK OUR SOFTWARE PRICES FIRST! Business-Education-Games for all popular computers. Free brochure. LOG-ON, Box 747, Winchester, CA 92396. (714) 926-1141.

FLOPPY DISKS for Apple's, TRS-80's, Commodore's, Atari's, IBM's, etc.—10 disks/Box SS/DD-BASF/\$20.00-Wabash/\$20.00-Scotch/\$23.00-Memorex/\$25.50-Maxell/\$28.00-Dysan/\$35.00—Double side and 8' also available. Shipping \$2.50/order. Add N.J. sales tax if applicable. COMPUTER DISK, 24 Washington Ave., Lake Hiawatha, N. 107034

FREE EDUCATIONAL SOFTWARE CATALOG—Pet, Commodore 64, Apple II+, TRS-80—Island Software, PO Box 300, Dept. G, Lake Grove, NY 11755. (516) 585-3755.

AIR NAVIGATION TRAINER—The most realistic program available for learning flight navigation. \$40. (Apple). Space-Time Associates, 20-39CC Country Club Drive, Manchester, NH 03102. (603) 625-1094.

VIC-20, COMMODORE 64, TI: Spreadsheet, File Manager, and other business programs. None more than \$19.95. For details: VALORUM, 441 Clyde Ave., Mountain View, CA 94043.

APPLE & ATARI—Software, Hardware, books, educational, etc. Great prices, outstanding service. Vulcan Software, 1805 Saulter Rd., Birmingham, AL 35209.

MINI-SCRIPT WORD PROCESSING SOFTWARE—All you need to write letters/reports! Features include justification/edit. TRS-80 Mod III only. Cassette \$9.95. Disk \$14.95. Huntley Enterprises, 4640 Malat Street, Oakland, CA 94601-4989.

VIC20 and C64 SOFTWARE: Special—Eighty VIC20 Programs on two cassettes, \$15.95. Postage \$1.50. Public Domain. SASE to FANFARE SOFTWARE, 120 E. Main, El Cajon, CA 92020.

APPLE-ATARI-COMMODORE SOFTWARE. Price list \$1.00. Please specify which computer. 20/20 VIDEO, Box 60132-A, Chicago, IL 60660.

ATARI SOFTWARE-Discount prices. Free catalog. La-Mont Software, P.O. Box 473, Herndon, VA 22070. (703) 620-3655.

HANDICAPPING PROGRAMS FOR MOST PERSONAL COMPUTERS. Free Catalog: Gambler's Edge Computing, Dept B4; 250 Richards Rd., Suite 254, Kansas City, MO 64116. 1-800-821-3343. 1-816-471-8660.

UNIQUE WpL program for use with Applewriter. Includes WPL progbuilder, zip code sort, search prog for user specified word/item/phrase. Complete printable documentation on disk and usable demo program. Specify Apple II+/IIe/III. Send \$24.95 to New Horizons, Box 4655, Medford, Oregon 97501.

COMMODORE 64, VIC-20, 99-4/A, SINCLAIR, and ATRAI software. Free catalog. Excaliber Enterprises. Dept. C2, Box 20093, Riverside, CA 92516 (714) 359-8567.

FREE money saving bulletin on popular brand name programs and books for your small computer. Superior, Dept. CR, 8030 Westchester Road, Westchester, OH 45069.

POSTER® Assists Income Tax Preparation, Budgeting, Bookkeeping. Check Book Summaries, Credit Card Summaries. Simple and Accurate. BASIC program in spiral bound pamphlet. \$20 postpaid. WOODSON Products, 700 Madras Lane, Charlotte, N.C. 28211 (704) 364-7634.

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FREE DISCOUNT CATALOG OF SYSTEMS, PERIPHER-ALS AND SOFTWARE. Most major brands. Descriptions complete with options and accessories. Please indicate your specific interest and application. Micro Trend Inc., 2001 Kirby Drive, Suite 906, Houston, TX 77019. (713) 520-0107

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COMPUTERS, PRINTERS, ACCESSORIES! Epson FX-80 Printer, \$519.00. Gemini 10X Printer, \$295.00. Okidata Prowriters, etc.—Lowest prices! Free catalog! Team Computers. (203) 777-2284. 109 Church St., Suite #303, New Haven, CT 06510.

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JOIN THE BIG RED APPLE CLUB, a national Apple user a group with benefits including monthly newsletter and large library of free software. Annual membership \$12. Sample newsletter \$1. BIG RED APPLE CLUB, 1301 N. 19th, Norfolk, NE 68701 (402) 379-3531.

JOIN A FAST GROWING COMPUTER CLUB for TRS-80 owners & users. Monthly Newsletter with FREE Programs and special club prices on computer accessories. Annual Membership \$16. Enclose this Ad with membership fee and receive Free Club Hat. To: American Computer League, P.O. Box 2726, Pomona, CA 91769.

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CABLE TV SECRETS, the informative publication the Cable Companies tried to ban. HBO, Movie Channel, Showtime, converters, etc. Send \$8.95 to CABLE FACTS, Box 711CC, Patascala, OH 43602.

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And now it's time for the

"YOU KNOW IT'S GOT TO BE TOO GOOD TO BE TRUE" DEPARTMENT

The following is a reprint of a bogus flyer which Steve Wozniak, co-founder of Apple, passed around at the First West Coast Computer Faire in April of 1977. How many will you take?

from altair "to zaltair"

Predictable refinement of computer equipment should suggest online reliability. The elite computer hobbiest needs one logical optionless guarantee, yet. **Fd Roberts** President, MITS, Inc.

Imagine a dream machine. Imagine the computer surprise of the century, here today. Imagine Z80 performance plus. Imagine BAZIC in ROM, the most complete and powerful language ever developed. Imagine raw video, plenty of it. Imagine autoscroll text, a full 16 lines of 64 characters. Imagine eye-dazzling color graphics. Imagine a blitz fast 1200 baud cassette port. Imagine an unparalleled I/O system with full ALTAIR-100 and ZALTAIR-150 bus compatibility. Imagine an exquisitely designed cabinet that will add to the decor of any living room. Imagine the fun you'll have. Imagine Zaltair, available now from MITS, the company where microcomputer technology was born.

Without software a computer is no more than a racing car without wheels, a turntable without records, or a banjo without strings. BAZIC is the language that puts ZALTAIR's powerful hardware at your fingertips. For example, you can test the entire memory with the MEMTEST statement. Or read the keyboard directly with the KBD function. If you like to keep time the CLCK function will really please you. And in case you're in a hurry, you'll be glad to know that BAZIC runs twice as fast as any BASIC around. The best thing of all about BAZIC is the ability to define your own language . . . a feature we call perZonality. And ZALTAIR's BAZIC language comes standard in ROM, to insure "rip-off" security.

hardware

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don't miss out

Weighing just 16 pounds, the ZALTAIR 8800 is a portable computer. The highly attractive enclosure was designed by an award winning team, and is fabricated from high-impact, durable ABS Cycolac® plastic. In the MITS tradition, nothing is compromised. Because of its superior design we were able to price the ZALTAIR 8800 far below the competition for this special introductory offer only. You will not find the ZALTAIR in any store. We want to bring this incredible offer to you directly, and avoid the retail mark-up of a middle man. Already, over 100 ZALTAIR's have been delivered to 75 satisfied customers. Don't miss out, order your ZALTAIR before April 30, 1977, and get immediate delivery.

And now our modern version of the super-bestest, latest and greatest, just plain neat-o-cool personal computer you can throw a dime at! The Multi-Adjustable Automatic Computer



The news is here and the news is big, the alliance between Microsoft, Intel, Hewlett Packard, AT&T, and McDonalds has hit pay dirt! The MAAC is among us!

Incorporating superb design and sophisticated technology, MAAC pushes aside, steps on and kicks the competition. It is every computer you need it to be; thanks to it's ground breaking pseudoadjustoDOS! This DOS is smarter than you are. No need to think to compute now! Why adjustoDOS? Well . . . just wait! The MAAC has broken the ground rules! It has new Multi-CPU Chip Changer with Random Chip Choice Programming. That's right, just pop in up to 6 different CPU chips of your choice, grab your VCR voice remote and you're ready to run anything. Just think of it, you can run all the best -Pentium, PowerPC, MIPS, Intel whatever86s, Motorola 68somethings and even some of your old favorites like the 6502 and Z80!

THE BRAINS HAVE IT!

How is this possible you say? That's the interesting part. We were experimenting for months at the Intel labs on a better main processor to direct the MAAC. So far, we could only come up with the 805867/8. And as you can guess, Microsoft, HP and AT&T were pretty worthless on the project. Then, when we were just about to throw our fifth prototype in the dumper, someone spilled the Mickey D's special sauce all over the motherboard! To our distaste and surprise, the acidity and grease amplified the throughput ratio by 1000%! Yep, the all-new, delicious Big-Mac5867/8 controls all of the functions of the multimultiprocessors and adjustoDOS. This gives you unheard of freedom to better express yourself. For now on, as a proud MAAC owner, you can snub your nose at other computer owners who say they can do this or that - YOU CAN DO IT ALL!! Keep'um guessing by choosing your software in stores with your eyes shut! It don't matter what it is, you've

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increase the flow of digestive fluids. They are small, easy to swallow and mild but thorough in action.

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have an effect similar to that Mrs. Place of castor oil on the lower bowel. They taste more like candy than like medicine and children really like them.

Constipation Poisons The System

Their usefulness, however, is not confined to children as they are equally effective for people of all ages.

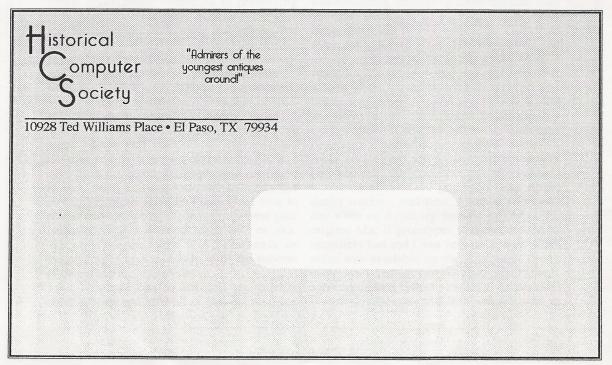
If you have to use a Laxative regularly, you will find Dr. Miles Little Pills and Dr. Miles Laxative Tablets, taken on alternate days, very effective.

I use your Little Pills and Laxative Tablets with splendid results. Mrs. Andrew Place Huntington, Vt. 25 Cents a Package.

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H_{Cs} 250

A Publication of the Historical Computer Society





WAR STORIES!

War Against Enigma

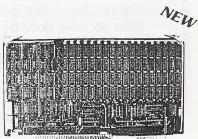
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FROM THE **EDITOR**

For those of you who might have missed our first issue - I introduced myself, the Society and this newsletter. I told you that I am in the military; the Army to be specific. Well, recently I was away for 30 days in the Mojave desert! You see, that's what we do in the tough Old Computer Brigade! Yeah, we scavenge the looking for desert outdated, tired, thirsty old comput . . . uh, wait a minute, I'll stop lying now. I'm in the Cavalry and we go to the desert once a year for training. In any case, I got a little behind with this issue and I apologize. As I began to quickly put it all together, more and more interesting happenings began to surface. I wanted to try and get everything in. In the future, I hope to always have the newsletter to your door by the 10th of the month. for under-Thanks

The Dog Ate your Newsletter

and 63 more excuses.

standing.

continues to grow and I continue to work hard spreading the word with press releases and letters. I am constantly posting messages on American Online and CompuServe. These postings beginning to pay off! A week or so ago, a young woman from MicroTimes magazine called me up and interviewed me about HCS. There will be an article about us in the next issue! Also exciting Posner is that I have sent newsletters and a press release to CNN's Future Watch show. Imagine if they did even a small mention of us! You can help us by telling those you know about this newsletter and HCS. Tell your local user groups and computer stores. Post messages on BBS'. If you're a user

CompuServe, please drop Interest in HCS by the Computer Shopper forum and chat with me as well as Stan Veit (Computer Shopper's own Historian) and others in the PC Industry History area. Also, please feel free to drop me an e-mail message anytime with comments or questions.

> This month marks the end of my solo writing performances with articles by three other writers - David Castlewitz. Michael and Mark Makower. Do you have a story to share or some important information that might help others? Let me know. We need your ideas and feedback.

Take Care,

(David A. Geechil

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Historical Computer Society

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What are you waiting for?

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- Staff -

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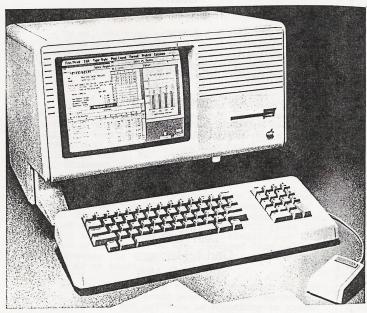
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- What's In your HB -

Where's Lisa Now?	2
VIC-20 Remembered	3
The Computer That Cracked the Enigma	4
more WAR stories?	5
Computer History Trivia ———————————————————————————————————	8
Book Review	9
HB Letters	9
Antique Parlor	10
Classifieds	11
"Are Some Things Better Left	40
Unsaid Department?"	_ 12

WHERE'S LISA NOW?

by Michael J. Posner



Everything PC and Mac users take for granted, windows, multi-tasking environments, mice, icons, pointers, trash cans etc., first appeared on the Apple Lisa, the first commercially viable personal computer with a modern, graphically based computer interface. (The Xerox Star system and its earlier contributions are duly noted.)

For the princely sum of \$9,995, users in 1983 received a 50lb integrated computer with two high density 5 1/4" floppy drives, known as twiggy drives (and later the subject of a major stockholder lawsuit), a whopping five megabyte hard drive, a high resolution 12" monochrome monitor with a built-in screen saver, one megabyte of RAM (made out of many 64k chips), two serial ports. three empty expansion slots, a mouse and a complete suite of applications. Lisa's software included - LisaDraw, similar to the early MacDraw; LisaWrite, a word processor similar to the early MacWrite; LisaCalc, a spreadsheet; LisaList, a flat file database; and LisaTerm, a terminal program.

Despite the Lisa's power and ease of use, sales were slow, in part due to the high price, but also due to Apple's inability to properly market the machine with Fortune 500 companies. In addition, the rival Macintosh division, headed by Steve Jobs who was denied the role as head of the Lisa project, also slowed sales as people awaited a machine with the

Lisa's power and ease of use at 1/4 of the price.

After a dismal of 6,500 only unit sales, Apple regrouped and made over the Lisa as the Lisa 2. Gone were the high density dual twiggy drives to be replaced with a Sony 400K 3.5 inch drive. identical to the original Mac's internal drive. The

Lisa 2 was sold in three models, the Lisa 2 with no hard drive, the Lisa 2/5, with a 5 megabyte external hard drive, and the Lisa 2/10 with a 10 megabyte internal hard drive.

Apple touted the Lisa as the file server for the Macintosh Office. Users could connect several Macs to the hard drive based Lisa 2/10 and one Laserwriter and have a complete local network.

Prices ranged from \$3,500 to \$5,500, and sales began to increase, especially when Apple introduced MacWorks, a program that allowed the Lisa to emulate a Macintosh with a larger screen and more memory. By the spring of 1985, demand for the Lisa, especially the Lisa 2/10 was outstripping supplies.

Just as the Lisa was catching on, Apple decided, in March of 1985, to terminate the entire project. No reason was given for the sudden turn around, but speculation existed that the Lisa cost more to produce, sell and support then the new low profit brought into the company. Other

reasons could have been the anticipated hard drive capable Macintosh, which could act as a server in place of the Lisa; or the fact that the decision to cancel the Lisa was made in late 1984, and not announced so that the rest of the stockpile could be dumped on unsuspecting end users.

Unlike many other orphaned computers, the Lisa found a savior in a company called Sun Remarketing. In early 1986, Sun acquired Apple's entire remaining stock of over 7,000 Lisas. Sun began to market the machines at new low prices. Sun also went forward with improving the emulation capability of the Lisa, by introducing hierarchical filing in 1986 and Mac Plus emulation in 1987. These products allowed a suitably equipped Lisa to perform like a Mac Plus with a larger monitor. The Lisa's only shortcoming was the lack of a sound chip, excluding compatibility for many games.

Sun also developed several add—ons for the Lisa line, including an 800K floppy drive replacement, a SCSI card for SCSI hard drive support, ram cards and even an accelerator board. Despite these efforts, the ever expanding Macintosh market meant that few Lisas would be sold, and users would switch rather than continue to upgrade their machines.

Sun continues to sell new Lisas for as low as \$395. A system with an 800K internal drive, 40 meg SCSI hard drive and a video fix kit costs only \$595.00. With a ram upgrade and software, the properly outfitted Lisa can even run Apple's System 7 software.

The Apple Lisa was a remarkable achievement and its original multitasking operating system and software can still impress. While not a success in the market place, the Lisa can stand proud as the mother of the Macintosh as well as windows based systems, and while I am writing this on my Windows based 486, my Lisa stands waiting, nine years after her production, to provide me with a unique and historic computer experience.

Michael Posner is the president of the *National Lisa Users Group*. Look for more about his group and other fellowship user groups in the next issue of *HB*.

Are you sitting down? GOOD! You're not going to believe this, but I still use my Commodore VIC-20! (Get the smelling salts, I think he fainted.)

Remember the VIC-20? Remember turning on the power and seeing "3583 bytes free" and thinking how much better that was than the Sinclair Z80 with only 1K RAM? With COLOR and SOUND yet? And for only a small fortune you could buy the datasette for incredibly slow program storage (with the inevitable "?load error" message

upon re-loading), and for a large fortune you could buy the 1541 disk drive with faster and more reliable saving and loading. Add another few hundred and you had the 1525 printer that gave you NSQ (Near Scribble Quality) printing. A few hundred more and you could get the 1501 color monitor for crisp, clear eight-color text from your 22 column/23 line computer (that could be equally well-read on a 2" LCD pocket TV.) You had a complete and almost useful computer for only about \$1000 (three months rent, groceries for a year or a down payment on a new car.) Hey, it wasn't so long ago, was it?

Now that we've taken a nostalgic trip down memory lane, you're asking me "Why are you holding on to, and what possible use could you have for, such an archaic computer?" (HEY! Remember, this is, after all, the Historical Computer Society!) Before I answer that question, let me ask you just a few. Do you have a camcorder? Do you consider



VIC-20 Remembered

by Mark Makower

"Last of the late-great Commodore users"

yourself a pretty talented videographer? Do you video-edit your tapes into presentable (tolerable to friends and relatives) finished products? Are you using anything for lead-in and finale text screens? If your answer to any of the above questions is "YES", then you should be doing what I'm doing; using my VIC-20 for readable intros and credits on finished VHS videos. Yes, the lowly VIC-20, with its 22-column screen is an ideal generator for text. Look at the facts: VHS is limited to about 240 lines of horizontal resolution by design. The VIC-20's 22-column screen, at eight pixels per character, requires only 176 lines of resolution in the text area of the screen, which is about 80% of the screen width. Add the additional border area, and you have the required resolution of 220 lines for clear, readable text in the VHS format, which VHS is fully capable of reproducing. Compare this to the 40-column screen of the Commodore 64 which would require over 320 lines of resolution to reproduce text.

Don't even *think* about using your 80-column PC!

To compliment the VIC-20's text and color capabilities, I've written a program in basic to make use of it as a video character generator. This program allows me to enter text and change both text and background colors. Titles and credits are stored in DATA statements which are typed into the existing programming lines, printed to the screen in READ statements, and then centered (relatively) on the screen. I

have written in several options; for introduction and in-between segments, I use text that changes with the pressing of the return key. This can also be used for end credits. However, a more impressive option is to have the credits scroll up the screen, one-at-a-time, with the speed controlled by the variable in a for-next delay loop. It's not a fancy graphics titler machine, but it works, and it makes good use of what might otherwise be a doorstop.

If you would like a copy of this program (if there are still any of you out there who have a working VIC-20) with printable on-disk instructions, I'd be happy to send you a copy for \$3 to cover disk and shipping costs (no cash, please; check or M.O. only for your protection.) Mail to: Mark Makower - 29 Argyle Road - Milford, CT 06460. This program is for non-commercial use of the programming code.

Jong before men dreamed of a computer on every desk, there were men who struggled with equal fervor to build mechanical brains to solve their toughest problems. The impetus was war. Europe was a captive continent

and Great Britain stood alone

against the Nazi war machine. Steel and bravery, in the form of weapons and people, were Britain's front-line defense. In the background, sheltered in secrecy, worked a team of scientists and mathematicians intent on building a new kind of weapon. Its purpose was singular: crack the enemy's codes.

The heart of wartime Germany's coded transmissions scheme was a unique machine called the Enigma. Before the war it was in common use by banks and other financial institutions. Its operation was simple. Three rotors inside the machine were preset according to a unique key. A message typed on the keyboard was encrypted on output. Whoever received the message would set the rotors of his machine according to the prescribed key and the message would be decrypted. Breaking the code required reverse-engineering the settings of the rotors, a laborious task for teams of cryptographers and math

wizards.

Luckily for Britain, a copy of the Enigma had been obtained before the war by Poland and was used extensively to decipher Germany's military transmissions. For quite some time, intelligence made German changes to the rotors on an infrequent basis: once a quarter, then once a month. Through a process of examination and

The Computer That Cracked the Enigma

by David M. Castlewitz

elimination, the Polish code breakers resolved the settings. But when Germany began changing the rotors every eight hours, human brain power proved not to be enough. Some other means had to be found.

By the time war erupted with Germany's invasion of Poland in September, 1939, the Enigma was further enhanced by the addition of a fourth, then a fifth, rotor. Secretly, the Enigma's workings were passed from Poland to England, where breaking the German code continued. Yet it wasn't enough merely to read the secret transmissions; in war, it was important to be able to react – and swiftly. Math experts

and brainstorming cryptographers were simply not enough to make a difference. With Poland conquered and France having capitulated, Great Britain was faced with a monumental job. Knowing what the enemy would do, and when, would make a big difference in the turbulent years to come.

Thirty miles northwest of London, midway between the great learning centers of Oxford

> and Cambridge, at a site called Bletchlev Park. a team visionaries was assembled. Led by Alan Turing, an erudite loner who became famous for his description of a thinking machine, this team set itself to the difficult task inventing a mechanical brain that decipher the Enigma

transmissions in min-utes instead of days.

While theory and math rested with Turing and his team, the engineering of this machine was assigned to a Mr. T. H. Flowers, whose major area of research up to that time had been the transmission of control signals for telephone switching equipment. To this end, he experimented with the use of radio tubes as digital switching devices. As a member of the top-secret Bletchley Park team, he was put in charge of building the code breaking computer.

In December of 1943, 11 months after the project began, Flowers' team delivered. The computer was called Colossus. It

achieved a speed of 5000 engineers of Bletchley Park mathematician panels and switches to silence and continued their Bletchley Park quickly as they were history transmitted.

Still, this wasn't enough. A faster machine -- and more of them --- and more of them -- over 20 years, and with personal computers since 1979. He is the invasion of Europe. By author of several books and invasion of Europe. By June 1, 1944, days before magazine articles on spreadsheets the allied landings at Normandy on D-Day, the Mark II Colossus was finished. Five times faster than its predecessor, it combined parallel operations with memory circuits, fivestage shift registers, and a logic switching panel that facilitated programming.

Working 24 hours a day, the Bletchley Park teams raced through the Enigma transcribed interceptions and provided valuable updates to the Allied intelligence operations. Nazi troop movements, submarine activity, and marine shipping schedules were easily revealed to the military.

At war's end, the math experts, cryptographers, electricians and

pulses per second, a went their separate ways, electronic clock provided taking with them the secret synchronization, a shift of their invention. Not until register tallied results, and 1975, after a silence of 32 its math was based on the years, did the British binary system. A complex government reveal the and sophisticated machine, it nature of the pioneering was controlled by teams of effort achieved by these woman who fed it punched men. Having built the paper tape codified with world's first electronic decision trees determined by computer, scientists such as who Turing and Flowers kept interactively adjusted patch true to their oaths of develop a program. Aided lives with other pursuits. If by their computer, the their pioneering accomplishcode ment had not been revealed, breakers were able to crack their story would be a lost the enigma ciphers as chapter in the amazing of computing machines.

> David Castlewitz has been working with computers for and database management.



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more WAR stories?

No, just interesting little tales we recently downloaded from the Internet while trying out Delphi's 5 hour free trial.

Most of these stories were dated from the mid-1980's.

 The TRS-80 Model 1 used to put out so much RF interference, that one way of adding sound to ANY program was to put a small AM radio right by the machine, and listening to the electronic "music". Some programs even used this trait of the trash-80, instead of connecting up the external speaker.

 In 1978, a company in my area which specialized in fruit orchard temperature alarm systems (it being necessary to awaken the farmers to start the smudge pots and ventilators (giant fans) in order to prevent damage to the fruit) decided they wanted to go into the TRS-80 I peripherals business. They hired me as an engineering technician and programmer.

There I was, working on programs to drive the peripherals, and having even the simplest programs crashing and going havwire for no apparent reason. Being brought up to never assume it's the machine's fault, I spent several weeks trying to figure out what I was doing wrong.

The one day my boss asked me to go to the company next door and assist them with a problem (they built hydraulic lift units, like the ones you see being used in construction...turned out we built the electronic control boxes for their lifts). I walk into the shop, and am confronted by 12 extra heavy duty arewelding machines (these guys were welding steel up to 2" thick!). After solving their problem, I traced the power mains. Sure enough, we were drawing our AC feed from the same source they were, A few hours, a couple of isolation transformers and caps later, and all of a sudden my code runs perfectly!

• My friend Doug used to work in a bank, in the OLD days. Their master file was on punched cards, with FOUR accounts per card. After Doug had programmed the daily update and put it in production, the bank examiners came to him saying, "We have noticed a drop in revenues in the minimum-balance account." Doug explained his program: "...and when the average balance for the month is below the minimum, the surcharge is applied." They said, "No, no! When the current balance EVER falls below the minimum, the surcharge should be applied." Doug said that didn't seem very fair, but they made the rules and he would fix the program.

Months later, the examiners came round again, quite suspiciously. They told him that they had noticed another drop in revenues in the minimum balance account. Doug explained that he had fixed the program, but he would surely look into the matter right away. After examining his program again, he went into the computer room to check the actual deck of cards that the operators used. He soon discovered the problem. He had added four patch cards to the end of the deck, one for each account on a master file card. Three of them were gone. It seems that as the deck was used day after day, the last card had gotten grubbier and grubbier. Eventually, the card reader would not feed it. But the program seemed to work fine to the card feeders anyway! Then the new last card died, etc.

The bank examiners were satisfied. Doug was relieved. And now we all know that patching is not the right way to go.

- A company had recently been converted to using a new type of coated fiberglass disk, to replace the old, heavy metal-platter kind in their computer. No problem there. Well, the system had this "Emergency Stop" plug on it that you would pull when an emergency occurred (they assumed it was for, say, a flood in the machine room). One late evening, a couple of the operators were sitting around being bored, and decided to see what would happen when they pulled "Emergency Stop". Immediately after pulling it, they heard a strange sound in the disk cabinet. Looking over, they saw an arm emerge from the side of the cabinet, on either side of a platter, and CLAMP down on the platter. Apparently, this wasn't made for use with fiberglass platters. They were picking splinters out of the walls for days.
- A bulletin board service in Oakland, CA, (Sunrise Omega-80) lost a drive when an ant walked across one of the disk drive heads as it was stepping.. smeared the disk, the drive wasn't too good either, and the board was down for several weeks..
- A while back I was the tech support person for a minicomputer OEM. Our customers were located all over the SF Bay area, we were located in Sunnyvale. Since the customers were spread around, I usually tried to diagnose and fix problems over the phone.

One day a Berkeley customer called me to complain that there were sparks and bad smells coming from the computer. I assured him that that was ridiculous - computers don't generate sparks. He said that it sure did - every time he tried to plug in his modem. I told him to try it again while I was on the phone, so I could try to diagnose the

- problem. He laid the phone's handset on the table rather than putting me on hold (it wouldn't reach over to the computer, but it was in the same room). Things were quiet for a few seconds, and then I could hear a loud yelp that made its way across the computer room and through the phone. He came back on the line and said the computer had bit him!
- There was a computer system that was experiencing intermittent power failures that were proving impossible to track down. Every means of recording device and electrical filter was used, but to no avail. The power failures always seemed to happen soon after lunch time, but for no apparent reason. After months of agonizing work, the technician finally figured it out: The room on the other side of the wall from the computer room was the men's bathroom. The grounding for the computer room circuits went to the water pipes that serviced one of the toilets. The building was rather old, and the toilets were in some need of repair. It seems that when one sat on the toilet seat, the weight of the sittee would cause the whole construction to lean forward a bit - not much, but enough to cause the marginally attached grounding wires to separate from the water pipes as the pipes bent along with the toilet - voila - the computer re-boots. I bet that was a hard one to track down!
- Pat Hume, one of the very senior profs in CS at U of T, once told the story of how he broke the FERUT. FERUT was FERranti U of T, one of the first computers in Canada -- a great vacuum-tube monster. It had something like a ten-step procedure for powerdown. From time to time this machine got modified.

One day Hume was the last

user of the day, and the time came to shut it down. Somebody had added an extra step to the shutdown procedure, presumably as the result of some modification, but either the writing was illegible or the instructions weren't clear. He did the best he could, and smoke started coming out. He hastily finished the powerdown procedure, and called Ferranti. They naturally said "your service contract is nine to five, we'll be there tomorrow morning".

Next morning, the Ferranti technical crew showed up and spent all morning in the machine room. From Hume's description, one got the impression of technicians half-inside the computer briskly hurling parts out. Hume, a rather junior professor at the time, sat in his office all morning waiting for the word on the multi-million-dollar computer he'd broken. People walking past in the hall would look in with pitying expressions. Towards noon, the Ferranti senior man walked into Hume's office with a double armload of parts, dumped them on his desk, and said "that's it". Machine restored to operation, the junior professor not having to contemplate spending the next fifty years paying back its price... But the really cute part was that the machine's reliability was markedly better after this episode. He'd managed to apply just enough stress to blow out all the marginal parts.

• It seems that there was a certain university that was doing experiments in behavior modification in response to brain stimulation in primates. They had this monkey with a number of electrodes embedded in it's brain that were hooked up to a PDP-11. They had several programs that would stimulate different parts of the monkey's brain, and they had spent over a year training the

monkey to respond to certain stimuli.

Well, eventually the PDP developed problems, and field service was called in. Due to some miscommunication, the field service representative was not informed of the delicacy of this particular setup, and the people

running the experiment were not informed that field service was coming to fix the machine. The FS representative then booted up a diagnostic system I/O exerciser. After several minutes of gyrations, the monkey expired, its brain fried. The moral, of course, is "Always mount a scratch monkey."

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Book Review

Steven Levy takes an inside look at the beginnings of Hackerdom.

About three years ago my brother Mike gave me a copy of this book and it quickly became one of my favorites. Though now out of print, I recently talked to Mr. Levy and he told me that a new version of *HACKERS* should be completed by years end. *HB* will print the details next issue. Check your local libraries and used book stores and you should be able to turn up a

In his book, Steven Levy talked to the Whiz Kids of the fifties and sixties to discover:

• What drove them into marathon sessions with MIT's mammoth mainframes and inspired them to redesign those hulking giants into amazing little game-playing, "user-friendly" machines.

HACKERS HEROES OF THE COMPUTER REVOLUTION

by Steven Levy

\$4.95 soft cover (price in Dec. 1985)

Bantam Doubleday Dell Publishing Group, Inc. 666 Fifth Avenue New York, NC 10103

- How California's *Homebrew Computer Club* stirred up ideas that laid the foundations for a host of new *Fortune 500* companies and made the fortunes of the richest new hi-tech multimillionaires in America.
- How the radical **Hacker Ethic** united them all in a shared vision and common addiction that has changed the way we live today and continues to determine how we will live tomorrow.

An incredibly interesting book. Mr. levy starts off by dropping in on the "original" computer hackers who secretly stalked the computer room at MIT. He calls this first section of the book "True Hackers." He then follows the adventures of the "Hardware Hackers" during the 1970s; men like Lee Felsenstein, Steve Wozniak, Ed Roberts and many others. All the stories about the pioneers are here and you get a sense of knowing these men and what they were thinking. In "Game Hackers", Levy tells the account of the early days at Sierra On-line software company. Ken and Roberta Williams had a dream and thus began the world of interactive adventure gaming.

Hackers is a book to be read over and over again. I've read it twice and still there is so much to be learned there. Steven Levy is a fantastic story teller with a writing ability that allows us to get to know the people he has met and interviewed. - DG

HB Letters

Hey! We need your feedback. Got a question, comment or suggestion? We want to hear from you. Send to:

HCS Letters 10928 Ted Williams Place El Paso, TX 79934

Dear HCS,

I enjoyed your first issue of *Historically Brewed* very much. I look forward to receiving the next one.

One thing though, in the article about GUIs you didn't mention anything about the Amiga. I feel that the Amiga also played an important role in the acceptance of using graphical interfaces.

Sincerely,

Brian Elders Orange Park, FL

Brian,

To be quite honest with you, I have never used an Amiga and I was not able to find much information on its history. I agree with you that it did have its place in the history of GUIs. Also not mentioned was the Atari GEM interface.

My article started off originally as a history of the Macintosh (which I have been using for about seven years) and I expanded it to cover GUIs in general. We need a good article on the history of Amiga and/or Atari. *HB* welcomes any stories on these two systems from our members. - DG

Dear HB,

I recently acquired an old Commodore 64 with the disk drive, but no software. I am having a hard time finding any software anywhere. Do you know of any good sources. It's as if no one wants to sell to us poor C64 users. I hope it wasn't a mistake buying it. Thanks.

Eric Hampton Tucson, AR

Eric,

You're now in the same boat as many other users of Commodore, Apple II, Atari, CP/M, etc. But don't give up. There is still tons of software out there; the trick of course is finding it. Check out this issue's new classified section. There are a few companies who might help you. We are constantly seeking other companies who specialize in selling older/outdated hardware, software, accessories and service. With time, we hope to make HB THE source for this kind of information.. - DG

Antique Parlor

The Coleco

n mid-1983, Coleco advertised a new machine to be known as "The Complete Computer System." This new, promised to be affordable computer system was the ADAM family computer.

The ADAM came in two flavors. The first was a stand-alone computer with a slot for playing ColecoVision cartridges. The second was an expansion module for the ColecoVision game system itself. Both systems included a

memory unit with a Z80A microprocessor, a fullfunction typewriter-style keyboard, a datasette and a daisy wheel printer. It came with a built-in word processor and could display to a color television set





or a monitor. Surprisingly, the word processor was very easy to use and quite unique. Its display was designed as a kind of computerized typewriter. A good idea for children and new computer users at the time. The ADAM had 80K RAM, but only about 64K was actually usable. This was entirely adequate for 1983. ADAM used CP/M as it's operating system and came with SmartBASIC on cassette. SmartBASIC was also easy to use since it was a virtual twin to Applesoft BASIC. A disk drive was made available shortly after it's initial release. The ADAM computer system sold for around \$700. The expansion module sold for around \$595. (The ColecoVision itself sold for about \$150.)

Sounds like a good computer system doesn't it? We have one in our collection and I like it very much. It could have had a solid impact on personal computing in the early '80s, but it did not. Due to bad advertising and marketing, Coleco did not sell many of their systems. Slow sells may have also been attributed to the price wars which had been going on between Texas Instruments and Commodore. The ADAM also received bad write-ups from Consumer Reports and Time magazines. It was reported that up to 30% of the units were returned to Coleco due to problems. By mid-1985, ADAMs were clearance items in toy stores at under \$200.

Question to all: What if SEGA or Nintendo were to release an expansion computer module for their systems today; would it work? - DG

- Historically Brewed Classified -

"Business Card" ads are available in *HB* for only \$10 per issue.

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And now it's time for the

"ARE SOME THINGS BETTER LEFT UNSAID?" DEPARTMENT

The following is a reprint of a letter which Bill Gates, cofounder of Microsoft, wrote and had published in the Homebrew Computer Club newsletter on February 3, 1976. Ouch Bill, take it easy guy!

An Open Letter to Hobbyists

To me, the most critical thing in the hobby market right now is the lack of good software courses, books and software itself. Without good software and an owner who understands programming, a hobby computer is wasted. Will quality software be written for the hobby market?

Almost a year ago, Paul Allen and myself, expecting the hobby market to expand, hired Monte Davidoff and developed Altair BASIC. Though the initial work took only two months, the three of us have spent most of the last year documenting, improving and adding features to BASIC. Now we have 4K, 8K, EXTENDED, ROM and DISK BASIC. The value of the computer time we have used exceeds \$40,000.

The feedback we have gotten from the hundreds of people who say they are using BASIC has all been positive. Two surprising things are apparent, however. 1) most of these "users" never bought BASIC (less than 10% of all Altair owners have bought BASIC), and 2) The amount of royalties we have received from sales to hobbyists makes the time spent on Altair BASIC worth less than \$2 an hour.

Why is this? As the majority of hobbyists must be aware, most of you steal your software. Hardware must be paid for, but software is something to share. Who cares if the people who worked on it get paid?

Is this fair? One thing you don't do by stealing software is get back at MITS for some problem you may have had. MITS doesn't make money selling software. The royalty paid to us, the manual, the tape and the overhead make it a break-even operation. One thing you do do is prevent good software from being written. Who can afford to do professional work for nothing? What hobbyist can put 3-man years into programming, finding all bugs, documenting his product and distribute for free? The fact is, no one besides us has invested a lot of money in hobby software. We have written 6800 BASIC, and are writing 8080 APL and 6800 APL, but there is very little incentive to make this software available to hobbyists. Most directly, the thing you do is theft.

What about the guys who re-sell Altair BASIC, aren't they making money on hobby software? Yes, but those who have been reported to us may lose in the end. They are the ones who give hobbyists a bad name, and should be kicked out of any club meeting they show up at.

I would appreciate letters from any one who wants to pay up, or has a suggestion or comment. Just write me at 1180 Alvarado SE, #114, Albuquerque, New Mexico 87108. Nothing would please me more than being able to hire ten programmers and deluge the hobby market with good software.

Bill Gates General Partner, Micro-Soft And now, what if Bill hadn't been quite so nice and friendly in his approach? How about if he had come right out and flew off the handle with his letter?!

An Open Letter to the Jerks Swiping Our Stuff

So why'd ya do it? Did you think we were stupid or something? Did you think we wouldn't figure it out? Nah . . . I'm a total moron! It's not like I've been to Harvard or anything! Gee, it was pretty much luck that I was able to write BASIC in the first place you must think. Well think again ya thieving bastages!

Almost a year ago, Paul Allen and myself, expected the hobby market to expand. That's why we hired Monte Davidoff and developed Altair BASIC. We wanted to bring a little quality to your pitiful little lives. You sit there on your loathsome, smelly behinds not giving a thought to the struggling programmer! You excrement! Without us what would you be doing with your stupid little 2K machines? We worked hard on that stuff, but you crumb bums think it is something to pass around free. Well this isn't a game and it isn't one of your nerdy swap meets - it's the real world!

What were you thinking? Get real! We have to make a living too. Starting tomorrow, I am declaring martial law on all software pirates! I WANT MY MONEY NOW! As a matter of fact, I want the \$500 price plus a \$100 fine for stealing. I'm giving all of you three days to come up with the dough. And I'm not going to worry about you doing it either. You know why? Because I know who you are. Yeah, I go to the meetings too! Surprise, surprise! I also know what kind of cars you all drive! And - I can find out where you live! What am I hinting at here? Well figure it out brainy.

Is this fair? I think so! Since you don't give a crap about me, I'm not going to give a crap about you either! If only you had done the right thing in the first place, all of this wouldn't be happening. If everyone had paid up, we probably could afford ten programmers right now to create exciting new software for you ingrates. But NOcococo!

You know . . we were already working on some new languages, but you bunch of mindless cretans don't deserve it. As a matter of fact, instead of even trying to hire ten more programmers, I'm going to hire ten "collectors". I'm going to get my money one way or another! It'll be pretty hard to use our BASIC with broken fingers! Ha Ha Ha!

From now on, we're playing hardball! No more selling to you geeks, we're only going to sell and license our software to major companies. You bunch of idiots can all drop dead! Nobody makes a fool out of William Gates!

I'LL MAKE YOU PAY!
YOU'LL SEE!
I'LL GET THE LAST LAUGH!

Bill Gates General Partner, Micro-Soft

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settle for Oh, Henry or even just a Kiss and Hug. SWF, 5'4", a little Chunky. Looking to travel the Milky Way with the right Goober. Don't Snicker. Together we can have Mounds of fun and create a Symphony. write Mary Jane, Hershey, PA.

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YARD SALE Contents of teens room. Kid gone off to college and I have to clean out to the bare walls so I can see if there's still a carpet on the floor and if the walls need painting. Hard rock punk LP's; tasteless magazines; disgusting posters; guady costume jewelry; black leather jackets, socks and underwear, the latter never been worn. Religious items from every sect known to man. No reasonable offers refused. EVERYTHING MUST GO! Saturday, 7am to 6pm. Rain or shine, earthquake or tornado. (no early birds)

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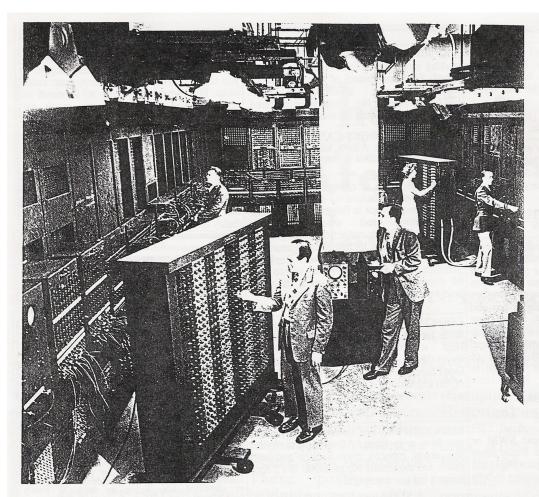
the debts incurred by my late husband Melvin Shlotznitsky. The bum never worked a full day in his life and couldn't walk past a bar without stopping in for a quick one, and I don't mean booze. Mother was right. I should have thrown him out when he came home from that office Christmas party with lipstick stains on his wallet.

LOST and FOUND

FOUND - 3 year old boy. Brown hair, brown eyes, 4'6", 87 lbs. Answers to the name of "Butch". Found 8/12/92 chewing barbed wire off of fence around church parking lot. If anyone wishes to claim him, please, <u>PLEASE</u> call Trininty Day Care Center ANYTIME. PLEASE! Bless you.

LOST - 1 Earring. Silver colored, in the shape of the H.M.S. Titanic, with 120 cubic zirconians as portholes and 20 garnets as lifeboats. Lost at sea while swimming 6/12/92 off shores of Sherwood Island Park. Has nostalgic value. REWARD. P.O. Box 25, Tucson, AZ. Still have matching earring. Don't ask why. Photos \$2.00

We had a huge response to our free classifieds from last issue - Yuk Yuk!



In 1943, at the height of World War II, a colonel in the U.S. Army requested a calculating machine for the artillery. The challenge was taken up by the University of Pennsylvania whose invention was presented in 1946, having taken 7,237 man-hours to perfect.

The machine was given the name ENIAC (Electrical Numerical Integrator and

The machine was given the name ENIAC (Electrical Numerical Integrator and Calculator) and was the earliest valve computer. ENIAC used 18,000 vacuum tubes, 1,500 relays and emitted the heat equivalent of 200 kilowatt fires. This enormous construction was housed in a room 29' by 98'. Memory and reliability were the early problems. ENIAC could only store 20 10-digit numbers and all the programming had to be done by rearranging the wiring. In 1952 over 19,000 tubes had to be replaced because the machine could only run for about two minutes before tubes started to burn out.

ENIAC's life was shortlived and it went into retirement also in 1952.

Historical Computer Society

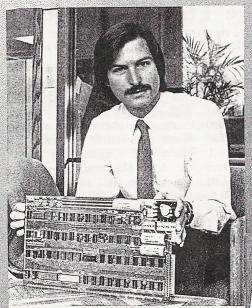
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The Beginnings of the Apple][

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What's New in What's Old!



WORD

FROM THE PUBLISHER

Hello again, thanks for stopping in at the Brewed! Whoops, another slightly late issue of HB. At first I had decided not to say anything about being late with issue #3 here, but I changed my mind. I am an honest person and I feel everyone deserves an explanation. Once again due to my Army engagements, HB was belated. Bear with me everyone . . only eleven more months to go for me in the military. Perhaps by then, HCS will become my fulltime job!

Did everyone like issue *2? So far I've only heard good things. We've received no less than two dozen letters since its release. No one has commented about the Bill Gates letter though: did you think it was funny?! Gee . . I liked it . . my favorite part of all this has been the funny stuff . . sniff, sniff. Anyway, a number of letters are printed for you in this issue. We have members with some very impressive collections of personal and computers workstations! Keep those letters coming in.

Things out there in the modern world of computing are sure getting heated! Almost seems like old times doesn't it? The teeth clenching, edge-ofyour-seat, knee quivering

History Repeated?!

The More Things Change, the More They Stay the Same!

excitement of the struggle of the emerging technologies. Intel and MS-DOS may not be king and queen of the heap anymore. Two things to think about - 1. Which new chip will be your chip of choice for the '90s? Lets see, there's the MIPS R4200 & R4400, DEC Alpha 21064, Motorola / IBM PowerPC 601 and the Intel Pentium. 2. Do you know which operating system you will want to use? Windows NT will of course be a choice, but OS/2 is growing and quickly! Have you heard of NeXTstep? Or maybe you might decide to run the Mac OS on your new computer with its DEC Alpha chip (my choice!) Yes, there is a good chance that ol' Apple will license out the cherished family jewels. Don't count out variations on UNIX either.

Wow! I have to admit that for a change the future of computing is almost as exciting as the stories of the past. In the beginning, there was the era of the S-100s. Then began the era of the "out of the box" computers mixed with the likes of Radio Shack, Apple and Commodore. Then CP/M seemed to start a new era and set the

first stage of standardization. In 1981, IBM and DOS blew almost every other platform out of the water and started the modern era of "PC" computing. In 1984, the Apple Macintosh started the era of the GUI though only recently have PC users fully embraced it with Windows 3.1. So what is the next era? It looks like we will have two simultaneously. The era of PDA/Palmtops and personal computers with fully open software architectures. Scary huh, is the "Berlin Wall" of computers really coming down thanks to a new democracy and freedom in hardware and operating systems?!

"future Watch the history" unfold. Don't get too comfortable with what you have now because . . heh . . wait a minute, what am I saying?!! I like old computers that other people consider junk! Who cares less about standards! Keep spreading the word about HCS and see ya next time.

David A. Theelish

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- What's In your HB -

The Beginnings of the Apple II Retold	2
The Art of Computer Collecting	7
The Computer Generation	8
Book Review	9
HB Letters	9
Classifieds	12
Tidbits for Collectors	

The Beginnings of the Apple II Retold Part I

by Steven Weyhrich

INTRODUCTION

This project began as a description of how the Apple II evolved into a IIGS, and some of the standards that emerged along the way. It has grown into a history of Apple Computer, with an emphasis on the place of the Apple II in that history. It has been gleaned from a variety of magazine articles and books that I have collected over the years, supplemented by information supplied by individuals who were "there" when it happened. I have tried not to spend much time on information that has been often repeated, but rather on the less known stories that led to the Apple II as we know it (and love it) today. Along the way I hope to present some interesting technical trivia, some thoughts about what the Apple

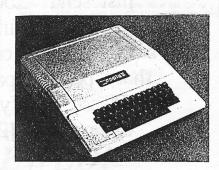
the Apple II still can be. The Apple II has been described as the computer that refuses to die. This story tells a little bit of why that is true.

If you are a new Apple II owner and use any 8-bit Apple Il software at all, you may feel bewildered by the seemingly nonsensical way in which certain things are laid out. AppleWorks asks which "slot" your printer is in. If you want to use the 80 column screen in Applesoft BASIC you must type an odd command, "PR#3". If you want to write PROGRAMS for Applesoft, you may have some of those ridiculous PEEKs and POKEs to contend with. The disk layout (which type is supposed to go into which slot) seems to be in some random order! And then there is the alphabet soup of disk systems: DOS 3.3, CP/M, Pascal, Il could have been, and what ProDOS, and GS/OS (if you

have a IIGS). If you use 16-bit software EXCLUSIVELY, you will probably see none of this; however, even the most diehard GS user of the "latest and greatest" 16-bit programs will eventually need to use an 8-bit program. If you can tolerate a history lesson and would like to know "the rest of the story," I will try to make sense of it all.

I think one of the Apple II's greatest strengths is the attention they have paid over the years to be backward compatible. That means that a IIGS "power system" manufactured a few years ago, with 8 meg of memory, a handheld optical scanner, CD-ROM drive, and 150 meg of hard disk storage can still run an Integer BASIC program written in 1977, probably without ANY modification! In the world of microcomputers. where technology continues advance monthly, and old programs may or may not run on the new models, that consistency is amazing to me. Consider the quantum leap in complexity and function between the original 4K Apple 1 and the ROM 03 IIGS; the amount of firmware (built-in programs) in the IIGS is larger than the entire RAM SPACE in a fully expanded original Apple

This strength of the Apple II could also be considered a weakness, because it presents a major



The Apple][

difficulty in making design improvements that keep up with the advances in computer technology between 1976 and the present, and yet maintain that compatibility with the past. Other early computer makers found it easy to design improvements that created a better machine, but they did so at the expense of their existing user base (Commodore comes to mind, with the PET, Vic 20, Commodore 64, and lastly the Amiga, all completely incompatible). However, this attention to detail is just one of the things that has made the Apple II the long-lived computer that it is.

examining the development of the Apple II, we will take a look at some pre-Apple microcomputer history, the Apple I, and the formation of Apple Computers, Inc., with some side roads into ways in which early users overcame the limits of their systems. We will follow through with development of the Apple IIe. Ilc, and IIGS, and lastly make some comments on the current state of affairs at Apple Inc. regarding the Apple II.

PRE-APPLE HISTORY

Let's begin our adventure in history. I've designed a special interface card that plugs into slot 7 on an Apple II. It contains an item its inventor called a "Flux Capacitor" (something about being able to modify flux and flow of time). The card derives its power from a self-contained generator called "Mr. Fusion" (another item I dug out of the wreckage from a train/auto accident in California a couple of years ago). Connected to the card via a specially shielded line, Mr. Fusion runs on trash (and is,

therefore, the ultimate computer peripheral, if you recall the old principal of "garbage in, garbage out"). Let's put a few issues of PC MAGAZINE into Mr. Fusion, and switch on the Flux Capacitor. (Incidentally, for this to work, it needs an Apple II equipped with a specially modified Zip chip running at 88 MHz). Boot the disk and set the time circuits for 1975. Ready? Set? Go!

** CRACKADOOM **!!

Did you make it all right? (Just don't touch anything -- you don't want to disrupt the spacetime continuum, you know!) Now, since the first Apple II wasn't released until 1977, what are we doing back in 1975? Well, to understand how the Apple II came about, it helps to know the environment that produced it. In 1975, the microcomputer industry was still very much in its infancy. There were few "home computers" that you can choose from, and their capabilities were very much limited. The first microprocessor chip, the 4-bit 4004, had been released by Intel back in 1971. The first video game, Pong, was created by Nolan Bushnell of Atari in 1972. Also in 1972, Intel had gone a step further in microprocessor development and released the 8-bit 8008, and then the 8080 in 1973. The year 1974 saw Scelbi Computer Consulting sell what some consider to be the first built commercially microcomputer, the Scelbi 8-H, based on Intel's 8008 chip. However, it had limited distribution and due to the designer's health problems it didn't go very far. The first home-built computer, the Mark 8, was released that same year. The Mark 8 used the Intel 8080 chip, but had no power supply,

monitor, keyboard, or case, and only a few hobbyists ever finished their kits. Overall, the microchip had yet to make much of an impact on the general public beyond the introduction of the hand-held calculator.

With the start of 1975 came a significant event in microcomputer history. If you will consider the early microprocessors of the years 1971 through 1974 as a time of germination and "pregnancy" of ideas and various hardware designs, January of 1975 saw the "labor and delivery" of a special package. The birth announcement was splashed on the front cover of a hacker's magazine, Popular Electronics. The baby's parents, MITS, Inc., named it "Altair 8800"; it measured 18-inches deep by 17 inches wide by 7 inches high, and it weighed in at a massive 256 bytes (that's one fourth of a "K"). Called the "World's First Minicomputer Kit to Rival Commercial Models," the Altair 8800 used the Intel 8080 chip, and sold for \$395 (or \$498 fully assembled). MITS hoped that they would get about four hundred orders for clones of this baby, trickling in over the months that the two-part article was printed. This would supply the money MITS needed to buy the parts to send to people ordering the kits (one common way those days "bootstrapping" "bootstrapping" a small electronics business). This "trickle" of orders would also give MITS time to establish a proper assembly line for packaging the kits. However, they misjudged the burning desire of Popular Electronic's readers to build and operate their own computer. MITS received four hundred orders in ONE AFTERNOON, and in

three weeks it had taken in \$250,000.

The Popular Electronics article was a bit exuberant in the way the Altair 8800 was described. They called it "a fullblown computer that can hold its own against sophisticated minicomputers now on the market... The Altair 8800 is not a 'demonstrator' or souped-up calculator... [it] is a complete system." The article had an insert that lists some possible applications for the computer, stating that "the Altair 8800 is so powerful, in fact, that many of these applications can be performed simultaneously." Among the possible uses listed are an automated control for a ham station, a digital clock with time zone conversion, an autopilot for planes and boats, navigation computer, a brain for a robot, a pattern-recognition device, and a printed matter-to-Braille converter for the blind. The exaggeration by the of the Popular authors Electronics article can perhaps be excused by their excitement in being able to offer a computer that ANYONE can own and use. All this was promised from a computer that came "complete" with only 256 bytes of memory (expandable if you can afford it) and no keyboard, monitor, or storage device.

The IMSAI 8080 (an Altair clone) also came out in 1975 and did fairly well in the hobbyist market. Another popular early computer, the Sol, would not be released until the following Other year. computers released in 1975 that enjoyed limited success were the Altair 680 (also from MITS, Inc., based on the Motorola 6800 processor), the Jupiter II (Wavemate), M6800 Technical (Southwest

Products), and the JOLT (Microcomputer Associates): they were all kits. The entire microcomputer market was still very much a hobbyist market, best suited for those who enjoyed assembling a computer from a kit. After you assembled your computer, you either had to write your own programs (from assembly language) or enter a program someone else wrote. If you could afford the extra memory and the cost of buying a BASIC interpreter, you might have been able to write some small programs that ran in that language instead of having to figure out 8080 assembly language. If you were lucky (or rich) you had 16K of memory, possibly more; if you were REALLY lucky you owned (or could borrow) a surplus paper tape reader to avoid typing in manually your friend's checkbook balancing program. Did I say typing? Many early computer hobbyists didn't even have the interface allowing them to TYPE from a keyboard or teletype. The "complete" Altair 8800 discussed above could only be programmed by entering data via tiny little switches on its front panel, as either octal (base 8) bytes or hexadecimal (base 16) bytes. With no television monitor available either, the results of the program were read in binary (base 2) from lights on that front panel. This may sound like the old story that begins with the statement, "I had to walk five miles to school through snow three feet deep when I was your age," but it helps to understand how things were at this time to see what a leap forward the Apple II really was (er, will be. Time travel complicates grammar!)

THE APPLE I: DEVELOPMENT

Homebrew the At Computer club in Palo Alto, California (in Silicon Valley), Steve Wozniak, a 26 year old employee of Hewlett-Packard and a long-time digital electronics hacker, had been wanting to build a computer of his own for a long time. For years he had designed many on paper, and even written FORTRAN compilers and BASIC interpreters for these theoretical machines, but a lack of money kept him from carrying out his desire. He looked at the Intel 8080 chip (the heart of the Altair), but at \$179 decided he couldn't afford it. A decision to NOT use the 8080 was considered foolhardy by other members of the club. Consider this description of the microcomputer "world" as it was in the summer of 1975: "That summer at the Homebrew Club the Intel 8080 formed the center of the universe. The Altair was built around the 8080 and its early popularity spawned a cottage industry of small companies that either made machines that would run programs written for the Altair or made attachments that would plug into the computer. The private peculiarities microprocessors meant that a program or device designed for one would not work on another. The junction of these peripheral devices for the Altair was known as the S-100 bus because it used one hundred signal lines. Disciples of the formed 8080 religious attachments to the 8080 and S-100 even though they readily admitted that the latter was poorly designed. The people who wrote programs or built peripherals for 8080 computers

thought that later, competing microprocessors were doomed. The sheer weight of the programs and the choice of peripherals, so the argument went, would make it more useful to more users and more profitable for more companies. The 8080, they liked to say, had critical mass which was sufficient to consign anything else to oblivion."

chip. Another Motorola 6800, interested Wozniak because it resembled his favorite minicomputers (such as the Data General Nova) more than the 8080. However, cost was still a problem for him until he and his friend Allen Baum discovered a chip that was almost identical to the 6800, while considerably cheaper. MOS Technology sold their 6502 chip for \$25, as opposed to the \$175 Motorola 6800. Wozniak decided to change his choice of processor to the 6502 and began writing a version of BASIC that would run on it. A friend over at Hewlett-Packard programmed a computer to simulate the function of the 6502, and Wozniak used it to test some of his early routines. When his BASIC interpreter was finished. he turned his attention to designing the computer he could run it on. Except for some small timing differences, he was able to use the hardware design he had earlier done on paper for the 6800.

To make the computer easier to use, Wozniak favored a keyboard over the front panel switches that came on the Altair. He also made it simple to use a television for a video terminal. (Recall that at this time the most common mechanism used for input/output was a teletype, which consisted of a keyboard,

typewriter, and if you were paper lucky, tape a reader/puncher). Functionally, it was a television terminal attached to a computer, all on one printed circuit board (another enhancement over the Altair). Wozniak used two 256 x 4 PROM (programmable read-only memory) chips to create a 256 byte program (called a "monitor") that looked at the keyboard when the computer was turned on. This monitor program could not do much more than allow entry of



Apple's original logo

hex bytes, examine a range of memory, and run a program at a specific address. (The Altair needed these "bootstrapping" instructions to be entered by hand each time the computer was turned on).

Because there were no cheap RAMs available, Woz used shift registers to send text the TV screen. Consequently, his video terminal was somewhat slow, displaying characters at about 60 characters per second, one character per scan of the TV screen. (This speed would be similar to watching a computer communicate via a modem at 1200 baud). It was slow by todays standards, but an advancement over the teletypes that could only type 10 characters per second. The computer had 8K of dynamic RAM. You could load BASIC into 4K of memory and have 4K left over for your own programs. It had a video connector, but you had to connect a monitor on your own. You also had to buy the keyboard separately and wire it into a 16-pin DIP connector. The power supply had to be connected to two transformers to get 5 volts and 12 volts for the motherboard. There was no speaker, no graphics, and no color. There was a single peripheral slot, and when it was first released there was nothing available to plug into this slot. It was entirely contained on a single printed circuit board, about six by eight inches in size (most hobby computers of that time needed at least two boards), used only 30 or 40 chips, and because it could run BASIC programs it got people's attention.

THE APPLE I: MARKETING

Let's adjust our time circuits for 1976, and jump forward in time. By now, Steve Wozniak had completed his 6502-based computer and would display enhancements or modifications at the biweekly Homebrew Computer Club meetings. Steve Jobs was a 21 vear old friend of Wozniak's and also a visitor at the Homebrew club. He had worked with Wozniak in the past (together they designed the arcade game "Breakout" for Atari) and was very interested in his computer. During the design process Jobs made suggestions that helped shape the final product, such as



Dan Kottke & Steve Jobs at the Apple booth at an early computer show

the use of the newer dynamic RAMs instead of older, more expensive static RAMs. He suggested to Wozniak that they get some printed circuit boards made for the computer and sell it at the club for people to assemble themselves. They pooled their financial resources together to have PC boards made, and on April 1st, 1976 they officially formed the Apple Computer Company. Jobs had recently worked at an organic apple orchard, and liked the name because "he thought of the apple as the perfect fruit--it has a high nutritional content, it comes in a nice package, it doesn't damage easily--and he wanted Apple to be the perfect company. Besides, they couldn't come up with a better name."

Jobs approached the owner of a new computer store in the bay area called "The Byte Shop." This businessman, Paul Terrell, expressed an interest in the Apple Computer (to be known later as the "Apple I"), but wanted only fully assembled computers to sell. If they could

provide this, Terrell told them he would order fifty Apples, and pay cash on delivery. Suddenly, the cost of making (and selling) this computer was considerably more than they expected. Jobs and Wozniak managed to get the parts on "net 30 days" (30 days credit without and interest), themselves up in Job's garage for assembly and testing of the Apple I. After marathon sessions of stuffing and soldering PC boards. Jobs delivered the computers Byte to the Shop. Although these "fully assembled" computers lacked a power supply,

keyboard, or monitor, Terrell bought them as promised. In July of 1976 the Apple I was released and sold for \$666.66, which was about twice the cost of the parts plus a 33% dealer markup. Two hundred Apple I computers were manufactured, and all except twenty-five of them sold over a period of ten months.

Although the Apple I was easier to begin using than the Altair (thanks to its built-in ROM code), it was still a time consuming process to set it up to do something useful. Steve Wozniak would have to type in about 3K of hexadecimal bytes before BASIC was ready to use. He could do it in about 20 to 30 minutes, but he almost knew the code by heart. The typical user was more limited in ability to use BASIC on the Apple I. To broaden the appeal of the Apple I (and at the insistence of Paul Terrell), Wozniak designed a cassette interface. It was mounted on a small two-inchhigh printed circuit board and plugged into the single slot on the motherboard. The card sold for \$75 and a cassette tape of Woz's BASIC was included with it. The advertisement Apple included with the card stated, "Our philosophy is to provide software for our machines free or at minimal cost." interface worked, but worked well only with cassettes running on expensive tape recorders. To try to further enhance sales, the Byte Shop stores found a local cabinetmaker that made some koa-wood cases for the Apple computer (so it would no longer be just a "naked" circuit board).

Interestingly, although most of the action in the micro world was going on in Silicon Valley, news of the Apple I made its way east. Stan Veit, owner of the east coast's first computer store, bought an Apple I and took it to a meeting of the Association of Computer Machinery. Those attending were quite skeptical that a REAL computer could fit into a small briefcase; they were sure that the machine was just a portable terminal, attached by a hidden phone line to a mainframe somewhere!

The exciting story of the history of the Apple II is just beginning! Look for part II in next issue.

- Part I Bibliography -

Michael Moritz, THE LITTLE KINGDOM

Gregg Williams and Rob Moore, "The Apple Story, Part 1: Early History", BYTE, Dec 1984

Frank Rose, WEST OF EDEN: THE END OF INNOCENCE AT APPLE COMPUTER

Chien, Philip, "Apple's First Decade: A Look Back", THE APPLE II REVIEW, Fall/Winter 1986

ost of the people I run into consider computer collecting rather odd. Most ask me how I can use that many computers, or comment how obsolete the computers I collect are and wonder how I can tolerate using them.

For me, computer collecting has nothing to do with use or power of the computer. It is based on an interest in all computers and a wonder about how they all work. Each computer design tackles the same problems with different approaches. It's interesting to see how the designer's decided to solve each

problem.

Plus, there is the historical importance of a computer. It is fun to own a computer that I have spent years reading about. Instead of just seeing a picture of the computer, I can hold it in

my hands and delve into its guts.

As we strive for faster and more powerful computers, we forget that at one time, each computer was considered "state of the art." I can remember when 64K was a lot of memory. Then it went to 640K. When I worked on an XT back in 1983, most

XT users wondered how they could even come close to using all 640K.

THE START

After 7 years as a computer hobbyist, I started reading books on the history of the personal/home computer industry. I had read about some computers that I had played with, but did not know they were important milestones in their day.

At that time I had about 4 computers. I have upgraded over the years and kept my old systems around. I remembered how a neighbor's daughter had an "old" Mattel

daughter had an "old" Mattel

Aquarius computer that she did not use. I figured I could get it cheap and see how it worked. After I bought the computer for \$10, I caught the collecting bug. Over the past five years I have gone from just a few computers to 49. All are "orphaned" systems and were bought fairly cheap.

Being an original Sinclair user, I specialized in the Sinclair line. Now I will buy almost any computer system as long as it is cheap. My main limit in a system is its physical size. I only have so much room in the "computer closet". I really enjoy the smaller home computers that seemed to snew forth onto the the smaller home computers that seemed to spew forth onto the market from 1982 to 1985. This is the time when everyone was making a home computer. Most died on the market. These oddball computers are fun to collect. It's fun to have the odd and

WHERE TO BUY

There are two key elements in computer collecting:

where to buy and how much to pay.

The most obvious place to start looking is the local classifieds. Most papers will have computers under a separate section or in the "Metro Market" section with the rest of the general items. Don't expect to find any great bargains here. These ads cost the seller money to place, so they must make some money in the deal. Local "freebie" classified newspapers are the same as general newspapers. You might find a few good computers in either one.

Any local Bulletin Boards (the old index card and thumb tack type) are good places to look. I worked at the Pentagon where these boards were on the Concourse. I have bought a few computers there. There are some computer BBS's that specialize in reselling computers, but they usually don't cover the odd and unusual. Similar to BBS's is Usenet, the World-Wide Unix-to-Unix BBS system. If you have access to a computer on the Internet, you might have Usenet access.

The best place to buy computers is any Ham Fests. Ham radio clubs sponsor local Ham shows. Since most Hams are into computers, computers are becoming more and more prevalent. About half of the booths sell computer related goods. You can find almost any system at a Ham Fest at almost any price. I picked up a PDP-11/05 for nothing. The "seller" was told by his better half not to bring the "box" home.

A large number of sellers are the same people you would find at a regular flea market. They are just there to get rid of a few computers that they have around the house. Most will allow you to haggle them down. I've bought systems from an ASR-33 Teletype machine to an Apple III. Here is where your

best deals are found.

Regular flea markets are not as good as Ham Fests. You might find a computer there, but you have to sift through a lot of old clothes and brick-a-brack. If you have limited time on the weekends, focus on the Ham Fests.

The Art of Computer Collecting

by Timothy Swenson

WHAT TO PAY

For me, cost is important. I have set a limit of \$50 per computer. If a computer costs more, I really have to think about it. Remember, I'm aiming for quantity, not usability.

As you look for computers through these various sources, note how much people are asking. This will give you an idea of what systems cost. Granted there will be a few who will try to get as much as they can for a system, but there are also those just trying to empty out the closet and make a few dollars to boot. I've seen a C64 with disk drives go for as low as \$10. Plus, a friend

haggled a guy down to \$1 for a daisy wheel printer (it is still working just fine).

The best thing to do is set your limit on what you would spend for a computer. Most computers are fairly common, so if you do not get a good deal today, one will come around again. There are a few systems that are a little more rare and you might have to grab them when you see them. Then it's a matter of how much you want that computer.

I've been looking for two computers for awhile now; a Sinclair ZX-80 (the first Sinclair) and a black Bell & Howell Apple II. I was lucky enough to find both at low cost. The ZX-80 was \$5 and the B&H Apple was \$15. Now I am aiming for a few British systems that either never made it to the American market or failed miserably. Ones like Dragon, Jupiter Ace (with built-in Forth instead of Basic), and Oric to name a few.

A good way to become familiar with computer systems that are no longer made is to visit your local library. Most of their computer books are a few years old and will cover these "golden oldies". Try reading a book like Fire In The Valley about the early PC industry. There are some good, yet old buyer's guide books that cover what were then the latest and greatest.

Half of the fun is getting to know about a number of older computer and the highest purpose of the party of t

older computers and the history surrounding them. The when's, why's, and how's about it's manufacturer; what made a particular computer special. It's all there to learn. Collecting computers gives me a better perspective on newer computer systems. Once I know computer history, I can see why computers were designed as they were and the reasons behind certain features. And, of course, it's fun.

So, happy collecting, and, from my programmer's view point, happy hacking!

s one of the "Baby Boomer" children of the 1950's, I can remember hearing on radio, reading in magazines, seeing on TV and in the movie newsreels (does that date me?) how someday computers would control our homes, do our work, and

make our lives easier.

Now it's 40 years later. The baby boomers have been waiting for the big event, still wondering when and where this great computer revolution is going to materialize. Oh, sure, most businesses couldn't get along today without a few PC's hanging around the office. But the average lower and middle class worker is still looking around, asking

"What about us?".

Well, my fellow blue-collar, hard working 50-year old taxpaying friend, don't look any further than your front door. Not only is the computer revolution over, but the computer won and you didn't even hear the bang. The computer has invaded your home, your everyday lifestyle, your way of life. This may come as a big surprise to you because you didn't recognize the invasion when it finally happened. The

invasion was subtle!

Way back in the 1950's computers were big, room-filling mysterious machines that made loud clicking noises, blinked lights, spun jumbo reels of magnetic tape, and spit out punched cards in fits of rebellion. The first silicon revolution changed all that. Those old computers used thousands of heat-producing, archaic vacuum tubes to enable them to add, subtract, multiply and divide, showing their answers on nixie tubes. Those old tubes were replaced early on by cool-running, solid state miniature devices called Transistors. At one-thirtieth the size of a vacuum tube, and not producing the high heat that required large cooling fans, the computer quickly shrunk to wall-size. Then came the second silicon revolution; the Integrated Circuit (IC). This put hundreds of transistors in a space the size previously occupied by a single discrete transistor. This reduced the size of the computer to that of an office desk

In the early 1980's, Large Scale Integration (LSI) further reduced the size of the IC, packing hundreds of IC's into the space of the original transistor. This reduced the computer to desk-top size. Along with the silicon (semiconductor) size reduction came a likewise reduction in the size of the magnetic storage medium, from 12-inch reel-to-reel tapes, to single 12-inch hard 8-inch drives, to floppies, to 5.25-inch floppies, to 3.5-inch floppies, to 3.5-inch hard drives. This has helped shrink the computer to laptop

"But wait" you say. "I can see all those fancy-shmancy computers everywhere I go, but I don't have any of those computers around my house! How has the computer revolution improved my home life. Where's the big invasion?"

The problem is, you're wearing blinders. You still think of a computer as something large that has a keyboard and a disk drive and a monitor. Your household computers have a new, modified, smaller version of all three. The disk drive (for data storage) has been replaced by IC's in the form of Read Only Memory (ROM) and Random Access Memory (RAM). And we've already discussed how small these IC's can be (pin-head size). The keyboard is still there, but it's not only smaller but disguised. You don't need 101 keys to do your data entry. Nor do you need the large monitor screen for output; an LED or LCD display is your monitor. Beginning to sound like stuff you have around the house? (Yep. The invasion is over!) In case you still don't get it, let's look around and identify some of the computers in your house:

1. Digital clock or wristwatch. You set the time via a few buttons (keyboard). You program an alarm (RAM) it keeps track of hours, minutes, AM, PM, month, date and day of the week (ROM). It displays it on an LED or LCD (monitor)

2. Microwave oven. Similar to the above. You program cooking time and temperature via keyboard, confirming your input on a fluorescent display, and the RAM and ROM remember what to do and for

how long

3. Television. What happened to the channel selector knob? The volume control? Brightness? Contrast? HORIZONTAL and VERTICAL HOLD? What, all your TV has is little buttons? And a REMOTE CONTROL? Guess what! That remote control is a computer, with a pretty obvious

L'omputer Generation

Mark J. Makower

keyboard on it. It relays your input to the TV that has it's own computer that receives your commands and responds faithfully, showing what you've requested via an ON-SCREEN DISPLAY. (Yep, your TV is your display device. Even looks like a computer monitor. Pretty sneaky, huh!) And inside your TV are more computers that change channels, vary the volume, contrast, color, brightness and sharpness. And don't look anywhere for the horizontal and vertical lock controls. Computers now monitor those signals and lock in the picture without you ever having to adjust them.

4. Garage door opener. A onebutton keyboard that sends a digital code to the receiver in the garage. The monitor is your garage door.

So you've surrendered! There are even more, similarly hidden computers all around you. Calculators! Digital FM radios! Your brand new CD player (It's literally ALL computer!). And your VCR.

Careful! It's spreading

outward. Your car's ignition and fuel injection are both computer controlled. Your car radio is digital. And your gauges may be, too. And about those time-delay windshield wipers? Driving to work? Traffic lights are becoming computer controlled for smoother traffic flows. Your speed is being checked by a LASER beam. Those traffic advisory signs along the road are being programmed by someone twenty miles away.

No doubt about it. The computer revolution is over, but

haven't we all won?!

Book Review

A New Guide for the Computer and Calculator Collector.

A blue book for computer collectors? Well, sort of. This book published earlier this year, is an excellent source of reference for anyone interested in personal computer history. It contains over 600 personal computers and calculators with over 300 illustrations. It helps to tell the story of the developmental history of the personal computer and home calculator.

The book begins with a very brief history of the microcomputer, devoting about a third of the text to the IBM PC. It is apparent that the author is bias toward the PC in general, especially when you reach the section about the IBM. In fairness though, while reading HB #1, you could probably tell that I have a soft spot in my heart towards the Lisa and Mac! I guess with any type of collecting, collectors will always have one favorite.

Important information is given for most of the computers listed. Most contain information about - processor type, initial RAM, type of display, data storage, production date and cost when introduced. Dr. Haddock also covers some different types of peripherals and software. He includes an

A Collector's Guide to Personal Computers and Pocket Calculators

by Dr. Thomas F. Haddock

\$14.95 soft cover

Books Americana, Inc. P.O. Box 2326 Florence, Alabama 35630

excellent appendix containing - information and history of microprocessors, acronyms and terminology, chronology of personal computer development and some recommendations to the beginning collector including: Altair, SWTPC, IMSAI, Kim-1, Apple II, PET 2001, TRS-80 model I, IBM 5150 PC, Mac 128 & 512, Osborne I, Compaq Portable and others. The book also contains a registration form and address to the Computer and Calculator Collector's Register*. Dr. Haddock describes this as a catalog for computer collectors. HCS has written to them and we will see if we can develop a working relationship.

An interesting and seemingly thorough reference book; the only negative thing I have to say about it is . . it isn't such a great collector's price guide! I agree with his value of the original Altair (\$800 - \$1200), and the Apple I (\$8,000 - \$12,000), but his values for some of the other originals like the Sol, SWTPC and IMSAI seem a little low as well as other more obscure S-100s from the '70s. In a nut shell, every other computer from about 1978 on, is worth between \$50 - \$125. The value in some cases just seem to be completely arbitrary. Perhaps it is a little premature for a complete and authoritative price guide. The fact is that the general public thinks any old computer is worthless and it is too soon to tell the rarity and value of these machines.

*Send your name, address and list of computers to: Computer and Calculator Collector's Register - P.O. Box 2626 -Ann Arbor, Michigan 48106. Tell 'em HCS sent ya! - DG

HB Letters

Great to hear from you. Please send us your questions, comments and stories. Send to:

HCS Letters 10928 Ted Williams Place El Paso, TX 79934

Dear HB,

Thanks so much for issue #2, but I haven't found a mention of my darling Kaypro. Have I missed something?

I'll never forget my joy in bringing her home. Just about a week before that, I had placed an order for an IBM, even put down a \$100 deposit. Then by chance, I picked up a book by Peter McWilliams, a kind of Consumer's Report of personal computers. And who got the best rating? Kaypro II, because it was portable, it came with a complete set of Perfect Software, and it was only \$2200. (The basic IBM was \$5000!)

I knew it wouldn't be easy to get my deposit back. I therefore exchanged my feminist hat for my "just a housewife" model, walked into the store meekly and told the manager my husband was furious and wouldn't let me " . . . buy a damn computer, who did I think I was???" It worked. He returned my deposit and I ran.

When I got my Kaypro home (or Kay, as I immediately dubbed her) my joy soon changed to frustration. The manual was impossible. It would take me two or three steps along the way and then go into gibberish. During the day I called the dealer, who was helpful. but -- when it happened at night, I climbed walls!

This was ridiculous. I finally went to see the dealer about taking his class, in spite of it being quite inconvenient for me. While I pondered, another customer said quite casually, "Why don't you join the Users' Group?" "What's that?" I asked. He told me. It sure made a lot of sense. The dealer who had been listening said there was no Kaypro Users Group in town. (This was Las Vegas, of all places!) Why didn't I start one? Good question. Why didn't I?

"Okay, I will!" and turning to the dealer I asked, "Do you have the names of everyone you sold a Kaypro to?" He did. He ran them off his printer right there, 45 names in all. (This was

I sent each one of them a letter describing my problems and guessing they had the same. I guessed right, because next week 23 people showed up in the Recreation Lounge of my apartment complex. After that, we grew like crazy. At our high point we had 200 members, and I remained the Elmer's' Glue that held us together. However, by 1985-1986 many of our members defected to the IBM, clones, DOS and the IBM Support Group. Some held onto their Kaypro's for nostalgic reasons. But the IBM served their needs better. More job opportunities, more software, more everything.

I still remained a True Believer. Kay was now my best friend. She had everything I wanted . . . word processing, a spread-sheet and a database program, all of which I knew well enough to run my home-based business. On top of that, I soon became the depository for old Kaypros -- just in case I'd ever need the parts. I now have three of them.

But my three Kaypros will not gather dust. Thanks to HCS, they will soon find a home in their collection.

Sincerely,

Rose Green

Berkeley, CA

Rose,

Thanks for sharing your story with us. We have a copy of that book by Peter McWilliams, it's called *The Personal Computer Book* published by Quantum Press/Doubleday in Sept. 1982 (ours is the first revised edition of October 1984.) Got it at a used book store - your best bet for great old computer books! In our edition the price is given at \$1,295, quite a drop in price over two years. McWilliams says it is "the Volkswagen Beetle of computers. It's not an elegant-looking machine, but it gets the job done."

Starting next issue we will have a dedicated Kaypro, CP/M column! -

DG

Dear HB.

The newsletter is an excellent job. I hope you can get others to contribute articles and/or classified ads.

I wonder how many collectors are out there? So far most people just scratch their heads, when I tell them I collect computers. A bewildered "Why?" is the most common answer. Usually the very same person calls me up a month later offering to sell me his Aunt Sally's IBM 8088 clone for \$600! "Well, it's an old computer isn't it?"

I'm sending you a list of the computers and software that I have collected so far. I collect all computers made before 1985. I'm always looking for more. At least 200 companies made proprietary non-IBM compatible computers before that date.

All the computers listed here are restored to full working condition with appropriate monitors. I have over 500 pieces of early IBM software, with manuals, that run on the 640K PC and XT. I also have more than 500 complete software packages and over 60 separate peripherals for the Apple and Commodore computers.

Amiga 500 (2)
Amiga 1000
Apple /// (3)
Apple][
Apple][
Apple][+
Apple][c+, monitor
Apple][e
Atari 400
Atari 800
Atari 1200XL
Atari 520ST
Basis 190 (CP/M & Apple][compatible)
Bondwell 2 (CP/M laptop)

Columbia portable
Commodore 128 (2)

Commodore C-64 (5) Commodore Vic-20 (4) Commodore Plus 4 (2) Commodore PET, 32K Compact Portable I Eagle II

Epson QX-10 (2)

Epson HX-20 (early proprietary notebook)

Grid Compass (early laptop)

Heath/Zenith Hyperion portable

IBM PC, 640K (2) IBM XT, 2fd, 20mb HD (5)

IBM Portable IBM jr. (5) Kaypro 2x Lisa, 20mb HD

Lisa/Mac XL, 20mb HD

Mac 128 Mac 512 Mac 512KE

Morrow MicroDecision 3

Morrow Portable Osborne I (2) Osborne Executive Sanyo 1255

Sanyo PC 1250 (proprietary notebook)

Tandy 1000 Tandy 1000SL Tandy Coco 1 Tandy Coco 2 Tandy Coco 3

TRS-80 model IV TRS-80 model IVp (portable)

TI 99/4 (3)

Timex/Sinclair 1000 (3)
Timex/Sinclair color computer

Victor 9000 (2) Xerox 820 II

Sincerely,

Victor Barbieri Corte Madera, CA

OK Victor,

Could you let me know when you're usually at work and what are the best truck rental places in your town? No really . . STOP IT!! OK, so our collection isn't crap compared to yours, so what!

Awesome collection. 54 different kinds of personal computers. Maybe one day you might get them all together and pose for a picture for *HB* OK? Thanks for sending your letter. - DG

Gentlemen,

Having been unaware of your existence until this week, I was surprised to learn about your group. I have been using and collecting early computer systems for about four or five years now.

I presently own the following systems, all in operating condition.

Osborne I

Morrow MicroDecision 11

Kaypro 10 TRS-80 4D Hewlett Packard HP-125 Vector 4 Xerox 820-II

These machines are being maintained, almost all of them have manuals and software. However, they are more than collector's items to me because they are used on a regular basis for things like correspondence and database applications.

Respectably,

Gary E. Cooke Washington, IL

Dear Members,

I am an avid computer hobbyist. I began in 1980 when I built a Sinclair ZX-81 computer kit. Since then I have progressed to a TI99/4a, an Apple][+, an Apple ///, a Sperry PC model 20 and a Leading Edge model D. My problem is that I couldn't part with any computer as I acquired more of them. When I recently bought a Sierra Data Systems S-100, I realized that I had become a computer collector.

It was in my search for information on the SDS 100 that I stumbled onto your club. I am looking for information on all types of odd computers, as well as other fanatics to write, trade, and learn.

As well as the computers above, I now own:

TRS-80 model III (2) Burroughs B21-45 CBM 8032 w/ Visicalc & Wordpro ROMs Commodore B-128

Sincerely,

David S. Brain 1606 Cleveland Ave. NW Canton, OH 44703-1212 (216) 456-2130

Dear HB,

Bravo on issue #2! I loved all of it, especially the "War Against the Enigma" article: I had no idea that anything resembling a computer was in use in the war effort back then.

Take care!

Erroll Foldes Briarwood, NY

Thanks Erroll! By the way folks, Erroll is the person who will be writing our Kaypro column starting next ish. -DG

Dear HB,

The magazine is great! I'm really happy to be a member. I collect old workstations and microcomputers. I'm enclosing a list of what I currently have not bragging, but rather in case that someone needs some information that I might have regarding one of these systems.

Workstations: Apollo DN 100/400 Apollo Dn 300 Apollo DN 3010 Apollo DN 4000 MIPS RS2030

Silicon Graphics IRIS 1400

SG IRIS 2000 Sun 2/50 Sun 2/120 Sun 3/50

Symbolics 3270 (incomplete)

TI Explorer I

Three Rivers Computer Corp. PERQ 1

TRCC PERQ 2 TRCC PERQ T-1 TRCC PERQ T-2 Xerox Dorado Xerox 1100 Xerox Alto II Xerox 1108 / 1109

Non-Bitmapped UNIX boxes: Charles River Universe 68/35F

CCI PowerStation 5/20 Micros (S-100): CompuPro "Big 16"

Cromemco Z-2D **IMSAI 8080**

Ithaca Intersystems DPS-1 NorthStar Horizon Sol model 20 Micros (CP/M):

Eagle II

Intertec Superbrain II

Kaypro II Morrow MD-11 NEC PC-8801

NorthStar Advantage 8/16 Osborne I

Osborne Executive Micros (other): Apple][Apple][+ Atari 400 Atari 800 Atari ST Commodore 64 Franklin ACE 500

Franklin ACE 1200

Yours,

Bill von Hagen Pittsburgh, PA

Bill,

Truly remarkable! Incredible

collection of 44! I have to ask Bill, where did you find all of these and how much money do you have invested? How about a picture from you also? -

HB,

Historically Brewed is a publication that I definitely want to subscribe to!

My first computer was a Sinclair ZX-81 bought in November of 1981. From there I moved on to the Timex/Sinclair 2068 and then to the Sinclair QL. Right now the QL is my main computer. It does all that I need to

I am also a computer collector, with a total collection of 49 computers. I'm working on getting a Mac 512 as my 50th.

For the past three years I have been editing my own newsletter, the QL Hacker's Journal supporting all QL programmers. I'm also involved on the InterNet with others interested in computer history and computer collecting. Here's my collection:

Sinclair ZX-80 Sinclair ZX-81 Sinclair Spectrum Sinclair Spectrum+ Sinclair QL Timex/Sinclair 1000 (2) Timex/Sinclair 1500 Timex/Sinclair 2068 (2) Cambridge Z88 PC8300 **BBC** Micro Atari 400 Atari 800 Atari 600XL Atari 800XL Commodore SuperPET Commodore Vic-20 (2) Commodore +4 Commodore C16

Commodore 64 (2) TRS-80 model I TRS-80 model III TRS-80 model 4p TRS-80 Coco TRS-80 Coco 2

TRS-80 Micro Color 10 (MC-10)

Tandy PC-4 Tandy PC-5 Tandy PC-7 Apple][Apple ///

Micro-Professor MPF-II

TI-99/4a (3) Mattel Aquarius SuperBrain II QD Osborne I (3) NorthStar Advantage Epson PX-8 Geneva Linus WriteTop

PDP-11/05 Spectravideo SV-328

Happy Hacking,

Tim Swenson Huber Heights, OH

Hey Tim I only counted 47, what'cha tryin' to pull?! Just kidding. Tim sent us a lot of good lists and information. One list we will run next issue, a list of books about computer history! Thanks Tim.

Well lastly, I thought I would run a list of the computers we currently have here in our collection at the office of HCS. Our list runs from the oldest to the newest:

Basic4 minicomputer & terminal Commodore PET, 32K TRS-80 model I Apple ||+ Timex/Sinclair 1000 Osborne I IBM PC TRS-80 IVp Apple Lisa 2 NEC APC Commodore 16 Commodore 64 Sharp Pc-1500A pocket computer Apple Mac 512 Commodore SX-64 Coleco Adam

All of the computers we have in our collection and the computers in our member's collections are an important part of Americana. Everyone, try and get some pictures to us, we're working on ours as well -DG

- A Correction -

Last issue I wrote a review of the book Hackers by Steven Levy and mistakenly stated that it was now out of print. Steven wrote us and let me know that Hackers has never been out of print and is now in its seventh printing. A new version should be out anytime now in a larger format "trade" version. So, fear not, go right out and ask for it by name. A "must have" computer history book. -DG

- Historically Brewed Classified -

"Business Card" ads are available in *HB* for only \$10 per issue. This offer good for upcoming issues until January 15, 1994. Send to: *HCS Classifieds - 10928 Ted Williams PL - El Paso, TX 79934*

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REMEMBER... Please mention that you saw the ad in HISTORICALLY BREWED!

There are many support forums for "ancient" and orphan computers on Compuserve. To help users locate support forums, here is a list of available forums: Model 100, 200, 600, NEC 8201 and Olivetti M10 are supported in their own forum called the Tandy Model 100 Forum+. Apple Lisa support is contained in the Macintosh Hardware+ Forum. Section 8, Early Macs contains software and messages for the Lisa. PCjr support is a sub-forum of the IBM Hardware+ Forum. The Computer Club + Forum is known as orphan alley. Support for the following systems include: Sanyo - Eagle - Timex Sinclair 1000/1500 - Z88/Actrix - QL - Panasonic - OSI - Adam - Victor 9000 - Apricot - Amstrad - Timex Sinclair 2068/Spectrum - Kaypro CP/M and DOS Machines

Two books worth looking at for information regarding computers from the first half of the 80's are *Digital Deli* by Steve Ditela and *Whole Earth Software Catalog* edited by Stewart Brand.

Digital Deli, printed in 1984 covers the state of art in computing at that time. Machines covered include the Epson QX-10, the Sinclair, the Osborne and the Vic-20. The book covers the entire computing experience, and is still eminently readable today.

The Whole Earth Software Catalog contains a very complete list of software available for the leading computer systems in 1984. Most of the software was for IBM PC compatibles, Apple II and CP/M machines. The book is no longer useful, but does give a historical look at software still around today like Flight Simulator, WordStar 3.3; Word Perfect 3.0, Word 1.1, 1-2-3 1a; dBase II and more. The Catalog also covers hardware choices, magazines and dealers.

NEC Starlet 8401A-LS Review

An early pioneer in the portable computer market was NEC, a Japanese electronics firm. One of their most popular models was the PC-8201, almost identical to the Tandy TRS-80 Model 100. In 1984, NEC introduced a more advanced version of the 8201, the NEC PC-8401A. It was a five pound computer based on a Z-80 microprocessor, a CPU that was very popular for 8-bit computing from the late 1970s to the early 1980s. The machine was a clamshell design with a full size keyboard and an LCD screen providing 80X16 lines. I have one of these computers.

The screen is very disappointing, though state of the art in 1984. No backlighting was provided and the character matrix produces a very ugly font which makes reading difficult. The contrast is extremely low and even in the brightest light, the screen is very hard to read. It takes bright sun or a very strong lamp to obtain semi-readable results. The screen is adjustable to a variety of positions and a contrast wheel adjusted the level of contrast.

The 8401A is a dual function machine. Out of the box the 8401 was similar to the Model 100. Built into the machine are four software programs, WordStar-To-Go, a subset of the old word processor WordStar, Cale-To-Go, a spreadsheet; a Telecommunications program and Filer, a simple flat file database for keeping a phone and address list. All programs are available from a start-up menu, and all data files accessible from the main menu, up to a limit of 31 files.

The 8401, when fitted with the optional CRT/Disk Adapter, becomes a complete CP/M machine. CP/M was the operating system of choice before the introduction of the IBM

PC. The disk adapter plugs directly into the left side of the computer through a system slot. The disk adapter allows for the connection of a monochrome or color monitor to the 8401 too, and provides the interface for a microcassette drive. Once the CRT/Adapter and disk drive are attached, a user could run any CP/M compatible software.

The 8401 has a full complement of ports. The rear of the machine contains a cassette port, a parallel port, a serial port, two RJ-11 jacks, a dc jack and a reset switch. The 8401 also contains

an internal 300 baud modem.

The keyboard on the 8401 is full size which allows for easy touch-typing. The keys provide good tactile feel and full travel.

The 8401 is powered by 4 c type batteries and will run for up to 8 hours. The 8401 also contains an internal nicad battery for backing up the main batteries. An ac adapter can also be used with the 8401A.

Overall, as I used the 8401A, I was impressed with its solid construction, simple interface, quality keyboard and durability (after all not many 9 year old portables are still working). If the screen was better, I might still use it as a note taker, with file transfer to a standard PC or Mac.

TRS-80 Model 100 Review

Most computers today last less than one year on the market, superseded by newer, faster and cheaper models. However, the TRS-80 Model 100 has had staying power.

Introduced in 1983, the Model 100 was one of the first successful portables in a world of 30 pound sewing machine luggables. The original 100 came with 8k of ram expandable to 32k in 8k increments. The 100 also included a 300 baud modem, allowing easy on the road communication. The inclusion of the internal modem was a first and made the 100 more attractive to users on the go. The 100 also included a standard RS-232 port for serial transfers to other computers or the use of a faster modem, a non-standard parallel port for printing, a nine pin port for a bar code reader, a non-standard port for connecting to a phone line, a cassette port for storing data (in 1983 floppy drives were expensive, but later a floppy drive was available for the 100), and an ac port for an ac adapter. The 100 also had two open slots for installing ROM software and system software.

Tandy sold over a million 100s in the 7 years the machine was on the market. Over the years several models were offered, containing 24k or 32k of ram, and a slightly thinner model with 32k was sold as the Model 102. The reason the Model 100 was so popular was its small size (8" X 11" X 2"), low weight (2lb), long battery life with 4AA batteries (15 - 20 hours), upgradeability and a large, easy to read 40 X 8 screen. Strong third party support helped make the 100 more usable. The 100 came with simple software for text editing, telecommunications, addresses and scheduling. These were augmented by many programs sold on ROM chips, including word processors, databases, data acquisition software and more.

There are no machines sold today that are like the 100. As sales slowed, Tandy went with regular DOS based portables. Yet the 100 remained a very useful machine. The keyboard is full size and perfect for touch typists. With the right cable, the 100 can easily transfer data to a Mac or PC. With a price of less than \$150, a used 100 serves as a great adjunct to a regular computer and may satisfy all of your portable computing needs.

Tidbits for Collectors

by Michael J. Posner

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FROM THE PUBLISHER

IT SURE IS GREAT TO HAVE FRIENDS!

Don't Worry, Us HCS Types Aren't the Only Computer Nostalgia Wierdies Around!

By David A. Greelish, Publisher & Editor

We have a friend in you, the reader. But in the last couple of months, we've made many new outside friends and associates. In this issue we tell you all about them. You, I and others know that the time is now to preserve computer history.

reetings fellow time travelers and welcome to another edition of the Brewed. Have you gotten tired of me apologizing the last couple of issues for always being late? Well check this out - this issue is actually early! Whoops!! OK . . you caught me again! It's early in a cheating sort of way. Last issue was for Dec. '93 - Jan. '94, and this issue is for Mar. - Apr. '94. What happened to February you ask? Well, it was a terrible month, so I decided to ignore it all together. No, actually, February has been a terrific month for HCS with many new members and lots of exciting news. What has happened is that ever since I began working on issue #2, momentum of tasks has grown and grown and the time between issues has been pushed shorter and shorter. It has gotten increasingly difficult for me to try and put the newsletter out by the 10th of the month for that issue. February hasn't been an exception. I've especially needed extra time this issue because now HB is four pages larger! I hope you also like the new look of the inside. I am trying to standardize the look of our newsletter in order to make HB more and more like a "real" magazine. In fact, if all goes as planned, next issue will premier Historically Brewed the magazine (with printed glossy covers).

I've needed some breathing room, so I decided to take the extra time with this issue. (The ol' day job sure demands a lot!) Another reason to change the months is to place six issues within each year so that the last issue of is a Nov. - Dec. issue without

crossing over years. You weren't worried about receiving your copy of HB this time were you? Don't worry, be excited! We are growing very steady and now even have members internationally. The word is spreading and quickly.

We now are being mentioned in some fellowship publications for users of outdated equipment. Journals like: The Computer Journal, 68' Micros and The Z-Letter. Plus, we have an associate computer history organization called The Computer History Association of California headed up by Kip Crosby. I'll be telling you more about these other groups and publications in our new feature called Friends of HCS.

Here's my most exciting news to share - on March 18, 19 & 20th HCS (myself) will be displaying our collection and Historically Brewed at the L.A. Computer Fair in Pomona, California! Kip Crosby from CHAC is my special guest. We will be enthralling thousands of visitors with stories of computer history and demos of old equipment. This show is billed as one of the largest computer expositions in the United States and 50,000 visitors are expected over the three days. Now of course, this is a show about new hardware and software; all of the other vendors will be pitching their latest wares to the unsuspecting hoards of buyers. But, this is good! We will stick out like a freshly hammered index finger through a hole in a glove! I expect at least 100 new members/subscribers to be generated by this show. There should be no lack of media coverage there as well.

Television networks and the major computer magazines should be in attendance.

The L.A. show is the single best advertising opportunity HCS has received. I am very excited about this show and would like to thank National Productions for allowing us to participate in this event. They believe that we will add something quite unique to the show. I agree! If you think you can make it by and visit us, it is located at the Pomona Fairplex. (105,000 square feet!) We will be in booth #849 on the left wall near the stage.

I am constantly sending press releases out to magazines and lately to television shows. Sometime soon, another golden opportunity will arise for us. There are big things ahead, thank you for all of your support here in the humble early days.

One last note. You may or may not have noticed that our price is now \$3 an issue. This increase will ensure that our future growth costs are covered. Next issue along with our glossy printed covers, I would like to add four more pages. I have plenty of stories and features. In the future, advertising should cover additional growth expenses. Write us soon and take care!

Historically Brewed is a bimonthly publication of the

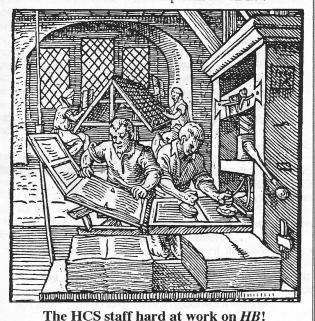
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Historically Brewed
ISSN: 1074-2557

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- What's In your HB -

From the Publisher	
HB Letters	2
The Apple II, part II	5
Kaypro Korner	1
Calculating Computers	13
My First Computer	14
Friends of HCS	15
Classifieds	16
A Problem in the Making	

HB LETTERS

READERS WRITE IN!

More members share their collections and comments. Write and tell us about your computer history!

Dear HB,

Having read issue #3, I felt I had to join in on the letter fun! I have been a computer collector for about four years now, and also have been in a state of computer de-evolution for four years.

Getting close to 40, and having had the computer revolution bypass me (actually turned off to computers due to a key-punch computer class in 1978), my jobs not being what I wanted, I returned to school for data processing in 1990. Most of the machines in the class were IBM. They worked great and I learned a lot, but eventually, they were not fun! Someone along the line had given me an old Tl-99/4A, but my schedule didn't allow time for "fun" computing. Eventually I found time to play and then the thing blew out on me! Thus began my search for fun computers which has never ended! Today, I am the proud owner of the following:

HCS Letters IO928 Ted Williams Place El Paso, TX 79934

Send your stories,

comments and

ideas to

TI-99/4A (4) Atari 1200 XL (no power supply) Atari 800 Atari 400 (1 working, 3 not) Timex/Sinclair 1000 (4) Timex/Sinclair Color Computer (no power supply) CoCo 1 CoCo 2 CoCo3 TRS-80 model 1 (not working) Commodore 64 (2 working, 2 not) Vic-20 (2) Commodore PET Altos 500 Coleco Adam (2 semiworking)

Yes, it's amazing what one can pick these systems up for. They have more uses other than collector's items as well. Personally, I don't have room for all that I like and have given away at least ten TI-99/4A's and seven CoCo's. I give them to people who have children who have never owned a computer. To them, it's still a new experience.

The "beaters" (as I call some of the oldies) are also food for experimentation. You can take them apart, and if you can"t put them back together, no sweat, they only cost you maybe \$5!

Having read past issues of the newsletter, I'm not sure if HCS is a club, or a therapy group! It seems like many people are coming "out of the closet" and admitting they own computers like the Timex Sinclair 1000. I'm one also, to be sure! I can't resist an orphan computer, but I have no more room! I admit it; sometimes I prefer cassette drives over disk drives!

Having read many books about the original "revolutionaries", let us not forget some obscure facts:

- Steve Wozniak used to like to go in restaurants and replace sugar dispensers with a chemical that foams up when it hits water. He'd sit in another booth and watch when someone used it.
- Steve Jobs' hair was so long and his appearance so repulsive, the Southern California minibuses refused to pick him up. When Apple became big and serious, they hired someone with a nicer appearance!

I feel the computer world needs more attitudes like this. It has become all big business and boring!

Take Care,

Marty Oborski Berwyn, IL

Marty,

Thanks for writing. I think it is great that you have given away so many computers which have in turn brought joy to children. It is true, old machines can still be a lot of fun and teach children or adults about the basics of computing. But hey, better keep it quiet about the midnight computer dissections! You may hear from some angry preservationists!

I like to consider myself a sort of rebel like the "two Steves". Just check out your hands now that this "joke" ink is all over them! Ha ha, made ya look! -DG

Dear HB,

Historically Brewed is an interesting zine indeed! It's good to see that there are other collectors out there. Seeing the lists in HB#3 makes me think I'm in the bush league, but my friends and coworkers think I'm off my rocker and that's enough for me. (For now!) I think I've

68

got somewhere between 25 and 30 computers around here, some ready to boot but most either in a closet or in storage due to limited space.

Some interesting omissions from both my own collection and the lists in HB#3: Exidy Sorcerer and anything by Ohio Scientific. I do know someone with an OSI Challenger 1P in Maryland, though (I found it at a hamfest for \$25 or so when I lived back there, and passed it on to him as his original one had succumbed to a flood some years previously). Sadly, I haven't seen another one since.

Another interesting omission in the HB#3 lists is the SS-50 bus. I haven't seen any of this at hamfests out here in Sillycon Valley for about three years now! Never fear, though -- I have both a Gimix 6809 box and a Smoke Signal Broadcasting Chieftain somewhere in my closet. The SSB is the more functional of the two, surprisingly, but this is mostly because I have no software for the Gimix.

It is somewhat disturbing to talk about some of these systems, especially the old S-100 boxes, as though what's on the outside is all that counts. For example, in storage are three IMSAI 8080s, none of which contain an IMSAI MPU card, and darn few if any IMSAI peripherals! One even has a Godbout motherboard which presumably replaced the original from IMSAI.... Of course, these kinds of substitutions were common in the early microcomputing era (and still are today in the PC-clone era): sometimes one manufacturer didn't sell a necessary item (e.g. one of the IMSAIs has a Cromemco ZPU, and a copy of its original purchase order (from 1977) shows that it was indeed bought with a Z80 CPU card, which IMSAI didn't offer) or said necessary item could be purchased at less cost from another manufacturer. Or even in more attractive packaging, such as some of the combo cards (e.g. Processor Technology's 3P+S, SSM's IO4).

This is something that has come to mind now that I have some systems in need of "restoration", namely the IMSAIs. Do I try to find parts to turn them into 100% made-by-IMS working systems (or at least as much as possible)? Do I simply collect a bunch of "period pieces" and try to make 'em work together? Or do I try to put together a "hot rod" with the fastest CPU, most memory, and racing stripes? Personally, I think I lean toward the last

two, but that's because it's what people (myself included) did then!

It's also worrisome to see your book review. The notion that there is already a collector's guide complete with blue book prices makes me worry that we're about to be invaded by a bunch of random non-hacker folks trying to make their fortune on old computers instead of baseball cards. (Not that I have anything against random non-hacker folks, but part of this hobby seems to be an appreciation of architecture.) Dang it, just when I thought I'd found a hobby where I could have some good cheap fun with junk no-one else wants! Ah well, I guess I'll have to check out the book and see if things are going to be as bad as I fear.

My first introduction to computers was in 1977, with the simultaneous appearance of the TRS-80 at Radio Shack and me at the local magnet senior high school (though they weren't called "magnet" schools then) where there was an HP 3000 series II minicomputer. At least in the case of the 3000, it must have been love at first sight, because there's almost always been one somewhere around me since, and of course there now is one (a series 37, only about 10 years old but able to run off apartment electricity) in my collection.

I didn't really get into collecting old computers until 1989. I was looking for something cheap and easily repairable to do hardware hacking on, and ended up with the SS-50 boxes mentioned above and about three S-100 boxes. Then I moved out to Sillycon Valley, and started finding all sorts of neat stuff at hamfests, including a couple of \$50 mini-truck loads of S-100 gear.

Best regards,

Frank McConnell Mountain View, CA

Frank,

You raise an interesting discussion about there being more to an S-100 than just the case. I think you summed it up best though by stating that "it's what people did then" in regards to mixing and matching S-100 cards. HCS has recently acquired our first S-100 systems in the last few months, and we have an assortment of cpu, I/O, memory and disk controller cards. We also now have an IMSAI

8080. Do we put the original IMS 8080 cpu card in it or a ZPU? Keep it at 8K or 64K? There are many options.

Personally, I believe in trying to restore "antiques" into what they were like when they first left the factory, but I want to play with the IMSAI, so I will "upgrade" it and retain the ability to make it original. For a museum, a curator must decide in what time period to "freeze" a piece for display.

I am sure that your fellow members enjoyed your story of how you got involved with computers as much as I. I urge others to share their experiences as well. -DG

Greetings David!

I was thrilled to receive your publication about a week ago. It is exactly what I've been looking for. I had originally feared that mainframes might be the focus of your group and newsletter, and that micros would be scantily covered. But, as I was searching for any group that would be concerned with old computers, I signed on. Thankfully I was wrong in my assumptions and HCS and Historically Brewed seem to be exactly what I want.

I greatly enjoyed my first issue (#3). So much so I'm forwarding the \$5.00 for the two back issues. I hope it will grow and become even more informative. I especially appreciate the book review (A Collector's Guide to Personal Computers) which provides much needed information for the collector. I only hope that as computer collecting becomes more known and popular, we won't fall prey to the gougers and the speculators who are involved not for the satisfaction and true interest, but for profit. I'm sure, however, we won't find these people in the HCS. I like the idea of a computer registry and for the curious, here's what I have:

Apple Mac XL
Atari 400, 800, 600XL, 800XL, 1200XL,
65XE (2)
Commodore PET 2001-8N, VIC 20, 64,
16, 128, 128D, SX-64
Coleco Adam (2)
Cromemco System 3
DOT portable
IBM PCjr (2)
Intertec Superbrain QD II
Mattel Aquarius (3)
NEC Starlet 8401-LS
Osborne 1 (tan case), 1 (gray case),
Executive

Otrona Attache portable
Tandy Model 1, CoCo 2, CoCo 3, MC10 (3)
Tano Dragon (2)
Texas Instruments TI-99/4A (5)
Timex Sinclair 1000 (3), 1500, 2068 (2)
Sinclair QL
Yamaha CX5M

Well, that's it off the top of my head, probably missed one or two. Of course, that doesn't include my 486DLC-40, but that's hardly collectable. Thanks for your efforts in establishing and maintaining the HCS. Please continue to keep up the good work.

Sincerely,

Allan E. Hamill Bryans Road, MD

Allan,

You know, almost everyone who has written with a list has at least one Atari, but we don't have one. An Atari will definitely have to be next. That is if we can find room. Here are the computers we've recently added:

Gavilan (proprietary DOS portable)
Workslate portable
IMSAI 8080
Homebrewed S-100 (Morrow?)
CompuPro 816 (S-100 w/ 1 Mb RAM!)
Sony SMC-70 (CP/M on 3.5" disks!)

You must write again soon and tell us (or just me perhaps!) what a DOT is! -DG

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THE APPLE II

IT'S BEGINNINGS RETOLD Part II

By Steven Weyhrich

In this issue. Part

ll examines the

creation of the

Disk II and tells

how the two

Steves built a

million dollar

garage.

Apple II and the

THE APPLE II: HARDWARE AND FIRMWARE

oving our time machine on to 1977, we can now look at Steve Wozniak's next generation Apple. Even as the Apple I was completed and was slowly selling, Wozniak was already working on making enhancements that would make his computer faster and more functional. He wanted to make it display in color. He worked to combine the terminal and memory functions of the Apple I by moving the display into main memory, allowing instant screen changes. Many of his changes were not added with the end user specifically in mind. Wozniak stated: "A lot of features of the Apple II went in because I had designed Breakout for Atari. I had designed it in hardware. I wanted to write it in software now. So that was the reason that color was added in first--so that games could be programmed. I sat down one night and tried to put it into

BASIC. Fortunately I had written the BASIC myself, so I just burned some new ROMs with line drawing commands, color changing commands, and various BASIC commands that would plot in color. I got this ball bouncing around, and I said, 'Well it needs sound,' and I had to add a speaker to the Apple II. It wasn't planned, it was just accidental... Obviously you need paddles, so I had to scratch my head and design a simple minimum-chip paddle circuit, and put on some paddles. So a lot of these features that really made the Apple II stand

out in its day came from a game, and the fun features that were built in were only to do one pet project, which was to program a BASIC version of Breakout and show it off at the club."

Wozniak added other features that he felt were important for a computer that was useful, one that he would want to own. Since

the 6502 processor could address a total of 64K of memory, he designed the computer with the ability to use either 4K RAM chips, or the newer (and more expensive) 16K RAM chips. The first Apple II's came standard with 4K of memory, and more could be added, to a maximum of 12K (if using the 4K chips) or 48K (if using the 16K chips). Specially wired strapping blocks attached to the motherboard told the Apple II how much memory was present and where it was. According to the 1981 edition of the APPLE II REFERENCE MANUAL, the Apple could have memory in the following sizes: 4K, 8K, 12K, 16K, 20K, 24K, 32K, 36K, or a full 48K. (These sizes were determined by the different ways that three RAM chips, either 4K or 16K, could be installed). The strapping blocks were even designed with the flexibility of allowing blank spots in memory if there were no RAM chips available to fill those spots.

The first 4K of memory always had to have

RAM present, since it was used by the 6502 processor, the ROM routines, and the text screen display. If, for example, you only had two other 4K RAM chips to install and you wanted to display hi-res graphics, you could strap one chip to the lower half of hi-res memory from \$2000-\$2FFF, and the other to the upper half of hi-res memory from \$3000-\$3FFF. Since 16K RAM chips cost about \$500 when Wozniak designed the Apple II, not many users could afford them. Whereas the Commodore PET and the Radio Shack TRS-80



Steve Wozniak (the "WOZ") From electronic hacker/prankster to multi-millionaire. A truly nice guy!

could not easily be expanded beyond the 4K they came with, the Apple II from the beginning was designed with expansion in mind.

The row of eight expansion slots was another feature about the Apple II that was a strong selling point. Unlike the TRS-80 or PET, you

could easily expand the Apple II by simply plugging a card into one of these slots. This degree of expandability made it more expensive to build, however. Steve Jobs didn't believe that anyone would ever need more than two slots, one for a printer and one possibly for a modem. Wozniak knew from his experience with computers at Hewlett-Packard that computer users would always find SOMETHING to fill those extra slots, and insisted that they keep the number at eight.

One problem Apple had to deal with was getting FCC approval for the computer. The RF (radio frequency) modulator that had been designed gave off too much interference, and it was probable that the FCC would not approve it. (The RF modulator allowed a user to attach the Apple to a standard television receiver, instead of requiring the purchase of an expensive computer monitor). Rather than have the release of the Apple II delayed for reengineering of the RF modulator to get that FCC approval, Apple gave the specifications for the RF modulator to Marty Spergel. He ran a small company (called M&R Electronics)



that specialized in obtaining hard-to-get parts that electronics and computer hackers wanted for their projects. Their agreement allowed M&R to make and sell the RF modulators, while Apple could concentrate on making and selling the Apple II. Dealers would sell an Apple II with a 'Sup'r Mod" (costing about \$30) if the buyer wanted to see the graphics on their color TV. Jobs assured Spergel that the item would sell well, maybe as many as fifty units (Years later a month. Spergel estimated that he had sold about four hundred thousand Sup'r Mods).

Other features that Wozniak (and Allen Baum,

who helped him with the project) included in the Apple II ROMs included the terminal software to do screen text display, expanded Monitor functionality, and cassette input/output routines. They added the ability to split the screen into different sized windows. They also wrote a disassembler, which was one of the most important features of the Apple II from the beginning and a significant part of its open design. It allowed ANYONE to view the 6502 code that ANY program used, and matched the philosophy of the Homebrew Club of making all computer knowledge available to everybody. In the Apple I days, when Apple was supplying software "free or at minimal charge", Wozniak and Baum published an early version of their 6502 disassembler in a hacker's magazine. It was designed to be loaded in memory on the Apple I from \$800 to \$9D8 and the routine could be executed from the monitor. This early code was quit similar to the disassembler that was later included in the Apple II ROM.

Having an expanded Monitor program in ROM and color graphics were not the only features in the Apple II that

attracted people to it. Having Wozniak's BASIC language in ROM, available immediately when the power was turned on, made it possible for non-hackers to write programs that used the Apple II's color graphics.

An interesting bit of trivia about Wozniak's Integer BASIC was that he never had an assembly language source file for it. He wrote it in machine language, assembling it by hand on paper: "I wrote this BASIC processor, and I wrote a little ALGOL simulator and got it simulated. It looked like it would work, but I had forgotten to build the machine. I had no assembler, that was another thing. To use an assembler, they figured that somebody was going to buy this processor (the 6502) to use for a company, and their company can pay a few thousand dollars in time-sharing charges to use an assembler that was available in time-share. I didn't have any money like that, so a friend taught me that you just sort of look at each instruction, you write your instructions on the right side of the page, you write the addresses over on the left side, and you then look up the hex data for each instruction--you could assemble it yourself. So I would just sit

there and assemble it myself. The (Integer) BASIC, which we shipped with the first Apple II's, was never assembled--ever. There was one handwritten copy, all handwritten, all handassembled. So we were in an era that we could not afford tools."

Even to this day there is not an official source code listing of Integer BASIC at Apple. And interestingly, the only error I am aware of in the Integer interpreter is one involving a single byte. If a line is entered that has too many parentheses, the "TOO LONG" error message is displayed instead of the "TOO MANY PARENS" message.



THE APPLE II: OTHER DESIGN FEATURES

Since Steve Wozniak was the designer of the Apple I and II, exactly what contribution did Steve Jobs make to the effort? Unlike Wozniak, who would not think much of extra wires hanging out of a computer that worked properly, Jobs had an eye for the appearance of the final product. He wanted the Apple II to be a product that people outside the Homebrew Computer Club would want to own: "Jobs thought the cigar boxes (housing the homemade computers) that sat on the ... desk tops during Homebrew meetings were as elegant as fly traps. The angular, blue and black sheet-metal case that housed Processor Technology's Sol struck him as clumsy and industrial ... A plastic case was generally considered a needless expense compared to the cheaper and more pliable sheet metal. Hobbyists, so the arguments went, didn't care as much for appearance as they did for substance. Jobs wanted to model the case for the Apple after those Hewlett-Packard used for its calculators. He

admired their sleek, fresh lines, their hardy finish, and the way they looked at home on a table or desk."

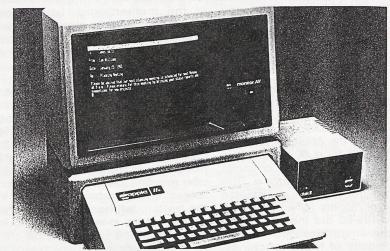
The final case design made the Apple II look quite different from most of their competition. The other computers looked like they had been assembled at home (and many of them were). The Apple had no visible screws or bolts (the ten screws attached at the bottom). It had the appearance of some variation of a typewriter, but still looked futuristic enough to be a computer. The friendliness of the design even extended to the lid, which popped off easily to allow access to the expansion slots, almost inviting the user to look inside (unlike most electronic devices that held the warning 'CAUTION! NO USER SERVICEABLE PARTS INSIDE").

Other gesthetics to which Jobs paid attention were the color of the keyboard, vents for heat dissipation (avoiding the need for a noisy fan), and a shape and color that would blend in with other items in a home or on a desk. He also hired an engineer who was good with analog circuitry (not Wozniak's area of interest) to design a reliable, lightweight power supply that would stay cool. The engineer, Rod Holt, was working at Atari at the time, but was convinced to help Jobs and Wozniak. developed a new approach (for microcomputers) by taking household current and switching it on and off rapidly, producing a steady current that was safe for the expensive memory chips. The final design of this switching power supply was smaller than a quart carton of milk and was quite reliable. Holt also helped design the television interface for the Apple II.

The new company was racing to have the Apple II ready for the First West Coast Computer Fair in April of 1977. Some last minute bugs had to be eliminated; because of a static electricity problem affecting a sensitive chip, the keyboards went dead every twenty minutes. Chris Espinosa and Randy Wigginton, two high school students who were early employees of Apple, had written programs to demonstrate the computer's color and sound. They were hurriedly working to duplicate these programs on cassette. People at Apple were working to fix blemishes in the computer cases that had returned from the plastics molding company. The name for this new computer was also finalized as "Apple II", following the example of Digital Equipment Company, who had given each newer version of its PDP series a higher number (PDP-1, PDP-6, etc.). They stylized the "II" in the product name by using right and left brackets, and displaying it on the case as ")(". The final product bore the mark of each person at Apple: 'The computer that appeared at the West Coast Computer Faire was not one person's machine. It was the product of collaboration and blended contributions in digital logic design, analog engineering, and aesthetic appeal. The color, the slots, the way in which the memory could be expanded from 4K to 48K bytes, the control of the keyboard and hookup to the cassette recorder, and the BASIC that was stored in the ROM chip--in effect the motherboard--was Wozniak's contribution. Holt had contributed the extremely significant power supply, and Jerry Mannock the case. The engineering advances were officially recognized when, some months later, Wozniak was awarded U.S. Patent #4,136,359 for a microcomputer for use with video display, and Holt was given Patent #4,130,862 for direct current power supply. But behind them all Jobs was poking, prodding, and pushing and it was he, with his seemingly inexhaustible supply of energy, who became the chief arbiter and rejector.

THE APPLE II: PRODUCT INTRODUCTION

As they prepared for the display at the First West Coast Faire, it was decided to create a new corporate logo. The original one, used in sales of the



Apple I, was a picture of Isaac Newton sitting under an apple tree, with a phrase from Wordsworth: "Newton...'A Mind Forever Voyaging Through Strange Seas of Thought...Alone." Jobs had been concerned that the logo had part of the slow sales of the Apple I, and the Regis McKenna Agency was hired to help in the design of a new one. "Rob Janov, a young art director, was assigned to the Apple account and set about designing a corporate logo. Armed with the idea that the computers would be sold to consumers and that their machine was one of the few to offer color, Janov set about drawing still lifes from a bowl of apples ... He gouged a rounded chunk from one side of the Apple, seeing this as a playful comment on the world of bits and bytes but also as a novel design. To Janov the missing portion 'prevented the apple from looking like a cherry tomato.' He ran six colorful stripes across the Apple, starting with a jaunty sprig of green, and the mixture had a slightly psychedelic tint. The overall result was enticing and warm ..."

"(Steve) Jobs was meticulous about the style and appearance of the logo ... When Janov suggested that the six colors be separated by thin strips to make the reproduction easier, Jobs refused."

For the Faire, Markkula had ordered a smoky, backlit, illuminated plexiglas sign with the new logo. Although Apple had a smaller booth than other companies displaying their products at the Faire, and some of the other microcomputer makers (Processor Technology, IMSAI, and Cromemco) had been in business longer, Apple's booth looked far more professional, thanks to

Markkula's sign. Some of the other participants, companies larger than Apple, had done no more than use card tables with signs written in black markers.

Because they had been one of the first to commit themselves to displaying at the Faire, Apple's booth was near the entrance and was visible to everybody entering the convention center. They demonstrated a kaleidoscopic video graphics program (possibly an early version of "BRIAN'S THEME") on a huge Advent display monitor, catching everybody's attention. But, after the Faire its organizer Jim Warren (Homebrew club member and editor of DR. DOBB'S JOURNAL) didn't think that Apple was a strong exhibitor. Byte magazine, in their report of the show, failed to even mention Apple. Despite these early opinions by influential people, over the next few months Apple received about three hundred orders for the Apple II, over a hundred more than the total number of Apple I's sold.

THE APPLE II: COST

Prebuilt systems were also sold by Commodore (the 6502-based PET, for \$595), and Radio Shack (the Z80based TRS-80, for \$600). This was quite a bit less than the Apple II's premium price of \$1,298 for a 4K computer, a pair of game paddles, and an audio cassette with demo programs. This price did not include a cassette recorder or monitor (which both the PET and TRS-80 did include). The hardware limitations and lack of expandability of those machines, however, offset some of the price difference. Also, one other hardware introduction for the Apple II that happened in mid-1978 set it well ahead of its immediate competitors; we'll get to that shortly.

THE APPLE II: EXPERIENCES OF EARLY USERS

The original manual for the Apple II was sparse. It consisted of thirty photocopied pages, including some handwritten notes from Woz. The cover stated, "simplicity is the ultimate sophistication: Introducing Apple)(, the personal computer." In early 1978 these original photocopied manuals were replaced with the new "Apple II Technical Reference Manual" (also known as the "Red Book"), and

copies were mailed to previous customers. Steve Jobs realized that people often viewed the quality of a product by the quality of its documentation, and so he took pains to get manuals that were easy to read and had a professional appearance.

Setting up an early Apple II was fairly simple. The lid popped off easily, and one of the first things you would attach was the Sup'r Mod (RF modulator). This was plugged onto two pins sticking up from the back rear of the motherboard, near the video output jack (assuming that you did not also buy a REAL computer monitor). The game paddles were two small black boxes, with a knob on the top attached to a potentiometer (similar to volume controls on a radio) and a tiny black button on the side. These boxes were attached via a narrow cable to a plug that looked (and was) fragile; this plug also went into a small socket in the motherboard. Lastly, you attached your data storage device (the cassette recorder) to the input and output jacks in the back of the computer.

After turning on the Apple II, the first thing to greet you was a screen full of random alphabetic characters and symbols, and possibly some colored blocks (lo-res graphics mode might be turned on). Here you had to press the RESET key in the upper right hand side of the keyboard, which, after releasing the key, would cause a 'beep!' and an asterisk to appear in the bottom left-hand corner of the screen. (If the lo-res graphics mode had been on, it would now be off). Next to the asterisk (which was a prompt to show that you were in the Monitor) was a flashing box, the cursor. To get into BASIC, you had to press the "Ctrl" key and the "B" key simultaneously. Now you would see a different prompt, one that looked like a '>'.

At this point, you could either begin entering a BASIC program, or try to load one from cassette. To load from cassette was not always easy; it took time to get the right volume and tone settings on the tape player in order to avoid getting the "ERR" or "*** SYNTAX ERR" message. (And if you didn't have much memory, you might get a "*** MEM FULL ERR" message!) When you got it properly loaded, you could type RUN and see what happened. Beyond that, it was more or less up to you to actually find

something to DO with your new toy.

THE APPLE II: EARLY HARDWARE ADD-ONS

Aside from the M&R "Sup'r Mod" that allowed early Apple II users to run their computer on their color TV's, some other enterprising hackers designed their own versions of modulators. One used by an early member of an Apple user group in Washington State (Apple Pugetsound Program Library Exchange, or A.P.P.L.E.) was somewhat better shielded than the "Sup'r Mod". It had its own power supply and plugged into the video output jack on the back of the Apple. The "Sup'r Mod" was by far the biggest seller, however.

At first, there were no interface cards for any of Woz's eight slots. With the limited funds that computer purchasers had then (and now) there was not much they could afford after shelling out anywhere from \$1200 to \$1800 just to get their own Apple II. But they were innovative, and like many other hardware hackers of the day managed to make do with old or surplus parts. Some people, for instance, had gotten their hands on used teletype printers, such as the ASR-33 (called "battleships" because they were so rugged and heavy). Since there weren't any printer interface cards to plug into the slots to allow the computer to communicate with the teletype, they used a trick they learned from Woz himself. The Apple II had four single-bit output pins on the game controller socket that could be used for various purposes. A schematic floated through the various user groups that showed how to connect the teletype to an annunciator pin; along with it was a machine language program that re-directed output from the screen to that one-bit port, and on to the printer.

THE DISK II

Let's put some more trash into Mr. Fusion to fuel the next leg of our trip. How about one of those KIM-1 computers over there in the corner of the Computer Faire auditorium? We might have to break it up a bit to make it fit ... Okay, now we'll just make a small jump, to December of 1977. By this time the Apple II had been generally available for about six months. Most customers used their

television as an inexpensive color monitor, and used a cassette recorder to store and retrieve their programs and data. Apple's major competitors were the TRS-80 and the Commodore PET. The products made by these two companies, together with Apple, could be considered as the second generation of microcomputers; they all came fully assembled and ready to use out of the box, with a keyboard and cassette interface. The TRS-80 and the PET even came with a monitors and cassette recorders. The strength of the Apple was expandability and graphics, while the strength of the others was cost (both the TRS-80 and the PET sold for around \$600, half the price of the Apple II).

By late 1977, Apple had introduced some enhancements to the II, including their first version of a floating point BASIC (called 'Applesoft") on cassette, and a printer interface card to plug into one of the slots on the motherboard. But the Apple II still needed something to make it more attractive to buyers, to stand out above the TRS-80 and the PET. One area that needed improvement was its program and data storage and retrieval system on cassette; it was a continued source of frustration for many users. The cassette system used on the TRS-80 was more sophisticated than that of the Apple II, allowing named files and easier storage of files and data on the same tape. On the Apple II it took VERY careful adjustment of the volume and tone controls on the cassette recorder to get programs or data to successfully load. The Apple cassette system also needed careful attention to the location on the tape where a program was stored, and was no more accurate than the number on the recorder's mechanical tape counter (if it had one).

Apple president Mike Markkula was one Apple II user that was dissatisfied with cassette tape storage. He had a favorite checkbook program, but it took two minutes to read in the program from the tape, and another two minutes to read in the check files. Consequently, at the executive board meeting held in December 1977 he made a list of company goals. At the top of the list was "floppy disk". Although Wozniak didn't know much about how floppy disks worked, he had once looked through a manual from Shugart (a

Silicon Valley disk drive manufacturer): "As an experiment Woz had (earlier) conceived a circuit that would do much of what the Shugart manual said was needed to control a disk drive. Woz didn't know how computers actually controlled drives, but his method had seemed to him particularly simple and clever. When Markkula challenged him to put a disk drive on the Apple, he recalled that circuit and began considering its feasibility. He looked at the way other computer companies--including IBM-controlled drives. He also began to examine disk drives--particularly North Star's. After reading the North Star manual, Woz knew that his circuit would do what theirs did and more. He knew he really had a clever design."

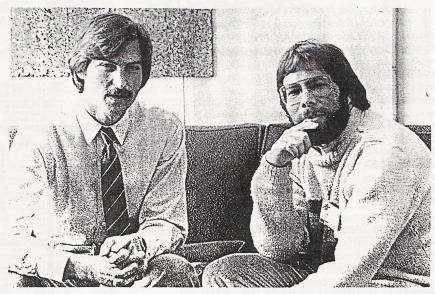
Other issues that Wozniak had to deal with involved a way to properly time the reading and writing of information to the disk. IBM used a complex hardware-based circuit to achieve this synchronization. Wozniak, after studying how IBM's drive worked, realized that if the data was written to the disk in a different fashion, all that circuitry was unneeded. Many floppy disks sold at that time were 'hard sectored", meaning that they had a hole punched in the disk near the center ring. This hole was used by the disk drive hardware to identify what section of the disk was passing under the read/write head at any particular time. Wozniak's technique would allow the drive to do self-synchronization

('soft sectoring'), not have to deal with that little timing hole, and save on hardware.

Wozniak asked Randy Wigginton for help in writing some software to control the disk drive. During their week of Christmas vacation in 1977 they worked day and night creating a rudimentary disk operating system, working hard to get the drive ready to demonstrate at the Consumer Electronics Show in the first week of 1978. Their system was to allow entry of single letter commands to read files from fixed locations on the disk. However, even this simple system was not working when Wozniak and Wigginton left for the show.

When they got to Las Vegas they helped to set up the booth, and then returned to working on the disk drive. They stayed up all night, and by six in the morning they had a functioning demonstration disk. Randy suggested making a copy of the disk, so they would have a backup if something went wrong. They copied the disk, track by track. When they were done, they found that they had copied the blank disk on top of their working demo! By 7:30 am they had recovered the lost information and went on to display the new disk drive at the show.

Following the Consumer Electronics Show, Wozniak set out to complete the design of the Disk II. For two weeks, he worked late each night to make a satisfactory design. When he was finished, he found that if he



Steve Jobs and Steve Wozniak in 1982

moved a connector he could cut down on feedthroughs, making the board more reliable. To make that move, however, he had to start over in his design. This time it only took twenty hours. He then saw another feedthrough that could be eliminated, and again started over on his design. "The final design was generally recognized by computer engineers as brilliant and was by engineering aesthetics beautiful. Woz later said, "It's something you can ONLY do if you're the engineer and the PC board layout person yourself. That was an artistic layout. The board has virtually no feedthroughs."

THE DISK II: COST

The Disk II was finally available in July 1978 with the first full version of DOS, 3.1. It had an introductory price of \$495 (including the controller card) if you ordered them before Apple had them in stock; otherwise, the price would be \$595. Even at that price, however, it was the least expensive floppy disk drive ever sold by a computer company. Early production at Apple was handled by only two people, and they produced about thirty drives a day.

Apple bought the drives to sell with Woz's disk controller from Shugart, right there in Silicon Valley. To cut costs, however, they decided to go to Alps Electric Company of Japan and ask them to design a less expensive clone. According to Frank Rose, in his book "West Of Eden": "The resulting product, the Disk II, was almost obscenely profitable: For about \$140 in parts (\$80 after the shift to Alps) (not counting labor costs), Apple could package a disk drive and a disk controller in a single box that sold at retail for upwards of \$495. Better yet was the impact the Disk II had on computer sales, for it suddenly transformed the Apple II from a gadget only hardcore hobbyists would want to something all sorts of people could use. Few outsiders realized it, but in strategic terms, Woz's invention of the disk controller was as important to the company as his invention of the computer itself." HB

Look for the final part to Steven Weyhrich's tale of murder, espionage and seduction in our next exciting issue! Aaaahh . . I mean, Steven Weyhrich's tale of Apple Computer, the two Steves and the creation of a truly remarkable computer system.

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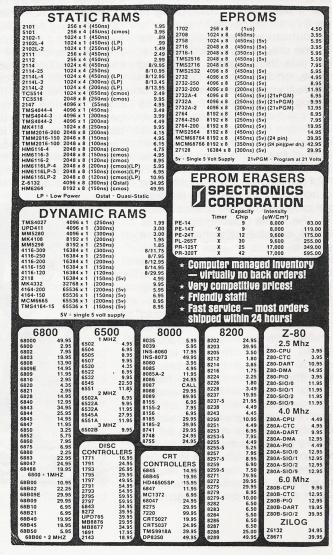
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KAYPRO KORNER

HOW KAYPRO STARTED Part I (1953 - 1983)

By Erroll Foldes

on-Linear Systems, Inc. (NLS in this document), was signed into existence on January 29, 1953 by 34 year old Andrew F. Kay, along with his wife, Mary Marble Kay, and Jonathan Edwards, directors. The articles of incorporation were filed with the California Secretary of State on February 17, 1953, establishing the firm to "engage in the business of research and development engineering of non-linear electronic and mechanical systems." At the time, the Kay's were residing in Del Mar, California. Kay was actually a shortened form of Kopischianski, which was his father, Frank's name. Kay grew up in Clifton, New Jersey, and received a B.S. degree in General Sciences from the Massachusetts Institute of Technology. He started out by working as an engineer for a few electronics companies and then started his own small but profitable electronic test and measuring device manufacturing firm. He relocated his business to southern California in 1947. In 1952, he invented the digital voltmeter, and this accomplishment earned him the honor of being called the father of the digital age. Kay founded NLS in order to market the device to the aerospace industry.

These days, the now 75 year old inventor and entrepreneur has been described as a wise old father type. Other sources

indicate that while brilliant and full of ideas, Kay was overly optimistic, ruthless and somewhat eccentric in business matters. Some of these qualities may become apparent in future installments of this history series.

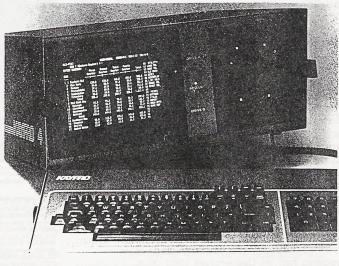
For the next 30 years, the firm was involved primarily in the design, manufacture and marketing of electronic measurement and test instruments for aerospace, defense and industrial applications. Their headquarters consisted of a 40,000 square foot plant on 8.16 acres of land in Solana Beach, California (a small suburb of San Diego), as well as a 3.4 acre plot of undeveloped land adjacent to the plant (planned for a never-to-be office building), Their product offerings

77

included (1) a portable battery powered test instrument line, consisting of miniature digital multimeters, miniature digital oscilloscopes (the world's smallest) and (2) a digital panel meter product line, consisting of voltmeters, frequency meters and digital counters.

Kay chose an office location just a mile from the ocean because he felt that this would provide employees with a healthy work environment. In fact, NLS provided a free health bar, where fresh vegetables and fruit juices were available. Proximity to the ocean also offered the firm's surfing-conscious employees opportunity to perfect their craft, and it has been said that many a "business meeting" was held sitting on surf boards while waiting for the next wave!

When the microcomputer market opened up in the late 1970's, Kay took a deep interest, and in 1981, NLS began development of a low priced portable microcomputer system to compete directly with the Osborne 1 (the very first successful portable micro) which had been introduced in April of that year. Dubbed the Kaycomp II, it was announced to the press in April 1982. With a proposed price tag of \$1,795, the prototype configuration (appearing at computer fairs and photographed for magazines new product reviews) had a Z-80A cpu, 64K RAM, two single sided, single density



The Kaypro 4

Kaypro Corporation was a major force in the microcomputer industry of the early 1980's, and was to the world of CP/M what IBM was to DOS. This series is presented as a tribute to this independent. innovative manufacturer; producer of high quality electronics.

computers and

1953 through

1992

peripherals from

floppy drives vertically on both sides of a center mounted 9° green monitor, and a cooling fan enclosed in a sturdy metal case with a high quality metal encased keyboard that clipped over the computer's face. This formed a portable 29lb suitcase. It came with CP/M 2.2 and a business software package.

When shipment of the Kaycomp II began in June 1982, its general layout was a bit different; the monitor appeared on the left with the two vertically mounted drives side by side on the right. The processor was the slower (2.5 Mhz) Z-80 and there was no cooling fan.

The terms of the manufacturing process note that NLS only manufactured the motherboards and metal cases "in house": monitors, floppy drives, power supplies, etc., were all purchased from third party vendors. For software, NLS maintained a fourteen person (1983 count) software department to enhance and review vendor supplied software as well as to develop proprietary software for NLS.

October 1982, announced a pair of new machines to replace the Kaycomp II; one, the Kaypro 5, would have been the industries first hard disk equipped portable. It was to have a 51/4",5.5 mb Winchester hard drive in addition to a single 51/4" double sided, double density (390K) floppy unit, and was to retail for \$4,500, but the computer was never produced. The other machine was the Kaypro II, a revamp of the Kaycomp II, but priced the same (\$1,795). Changes included the addition of double density to the floppy drives increasing total capacity of the two drives from 200K to 400K, and on later machines, reorientation of the drives to a horizontal format. Note that at this time NLS was calling their computer division "Kay computers". One review of the machine stated that there were plans to change the Kaypro II's case to plastic to save weight, but obviously this never transpired. There was still no fan, but apparently heat was not a problem due to efficient layout of the hardware components in the cabinet (the efficiency of this design was a testament to the enterprise NLS had developed in manufacturing durable and heat efficient test equipment). Even so, later Kaypro II's did include a cooling fan. In December 1982, NLS improved the line-up of bundled

software available with the Kaypro II with the addition of the Perfect Software group which included Perfect Writer, Perfect Speller, Perfect Calc and Perfect Filer. The price remained unchanged at \$1,795.

Aesthetically, the Kaypro II received a mixed reception from reviewers (one called it high-tech while another said that its nuts and bolts look would be more appropriate for the back of a pickup truck than for an office!), but one thing everyone did agree on was its sturdiness and low price. The machine's unique look reflected the innovative and creative atmosphere nurtured at NLS although the relaxed, unorthodox management style would later cause problems for the firm.

The Kaypro II was clearly a bigger hit than the Osborne (with its larger screen, better quality keyboard and superior software bundle) even though both manufacturers offered tremendous value. NLS not only offered voluminous software, but beat out Osborne through formidable price cutting (cutting the Kaypro II's price by \$200 in May 1983 causing Osborne to follow suit). Sales of the machine were so great that NLS decided to corporate under the banner of Kaypro (keeping NLS as a subsidiary) for the purpose of raising capital to increase production. A preliminary prospectus was issued on July 1, 1983 and Kaypro Corporation went public to a warm reception on August 25th. The issue was underwritten by Prudential Bache Securities

In July 1983, NLS released two new machines on the heels of the Kaypro II. One, the Kaypro 4, was

essentially the same as the Kaypro II, but in addition had double sided. double density drives that provided 390K of storage each and came in a gunmetal grey cabinet in contrast to the Kaypro II's bright blue and silver color scheme. The big news though, was the implementation of the integral hard disk concept that was scheduled nine months earlier with the stillborn Kaypro 5. Dubbed the Kaypro 10, this machine sported a shock-mounted 51/4" 10 megabyte hard drive, a single 390K floppy drive, the faster Z-80A (4 Mhz) cpu and a vast array of bundled software including two word processors, two spelling checkers, two spreadsheets, two communications programs and three versions of BASIC! The 9" screens resolution was improved over the Kaypro II and 4 allowing for good quality character graphics. Priced at \$2,795, it was a steal and had the honor of being the first hard drive equipped portable computer. (Delays in hard drive shipments caused substantial delays in deliveries of Kaypro 10's and these problems continued until November 1983 after which deliveries proceeded on schedule.)

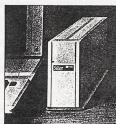
During this time the Kaypro II remained Kaypro's biggest seller. From the commencement of Kaypro II shipments in June 1982 to the time they went public, they had already sold 47,500 units! Osborne would soon succumb to the Kaypro II's onslaught by filing for bankruptcy protection in September 1983. ##B

Look for Erroll's Part II covering 1983 - 1992 in the next issue. HB will avoid splitting stories in the future (when we get bigger!). -DG

What every Apple II+ and IIe user should ask before buying the "Sider" 10 MB hard disk:

When a company offers a superior quality 10 megabyte Winchester hard disk or only \$695, it's bound to raise a few eyebrows...and a lot of questions. The fact is, you're probably already wondering "Can't really get a 10 megabyte hard disk thats reliable for only \$695". The answer is: ABSOUTEET...when you choose the Sider from First Class Peripherals.

What's so great about the Sider? For starters, the Sider lets you boot your Apple III-9 or III directly off the hard disk—unlike some other Winchester subsystems. Rebonting is also trubule-free. And the disk is partitionable, allowing you to allocate space to four operating systems on the same disk. The Sider supports: Apple DOS 33, Pro DOS". Apple Pascal; and CfyMPs



"Only\$695?"

tribution expenses, and pay only for the product.

he product.

What about a guarantee?

What about a guarantee?

What about a guarantee?

Like many experienced Apple users, you may be reluctant to buy a hard disk priced at only 5695 without first seeing for yourself how it performs. That's why First Class Peripherals offers you a reassuring, money-back guarantee that eliminates any risk on your par. Simply order the Sider and use it for 15 days. Then, if you're not entirely satisful return it and receive a full refund—no questions asked.

The Sider also comes with a full one-year limited warranty. Plus, there's a convenient, toll-free hotline you can call anytime you have a technical or service question, or need help.

CALCULATING COMPUTERS

THE FORGOTTEN FIRST HOME COMPUTERS

Presented by the International Association of Calculator Collectors

By Bruce L. Flamm, Co-Founder, IACC

any people think of the VIC 20 (1980) or the Tandy TRS 80 Model 1 (1977) as the first home computers. Early hackers will recall that the Altair 8800 (Intel 8080/2 Mhz/0.25 kb RAM) was introduced by MITS (Micro Instrumentation and Telemetry Systems) in 1975. The Altair 8800 predated the Motorola based Altair 680. A few other computers were apparently sold in small quantities before 1975 but with over 5,000 units shipped in 1975, the Altair 8800 is considered to be the first true mass market microcomputer. Perhaps it's key element was the fact that, in contrast to electronic calculators with preprogrammed "function" keys, the microcomputer could be programmed by the user.

What many people don't know is that the first programmable pocket calculator was shipped in January 1974, at least a year before the first Altair 8800. The Hewlett Packard HP-65A boasted 100 program steps and 9 memory registers. Software "application" packs with preprogrammed magnetic cards were soon available for the HP-65. The HP-55 (HPs first keystroke-programmable calculator) came out in January 1975. Unfortunately, it did not have continuous memory so each time it was turned off, the entire program would be lost and everything would have to be keyed in again ouch!

In September 1975 Texas Instruments (TI) introduced their first programmable calculator, the SR-52, which could store up to 224 program steps on a single magnetic card. Program libraries for various scientific fields were soon available. In January 1976 TI announced the 100-step SR-56 with 2 looping capabilities and 4 levels of subroutines. In May of 1977 TI announced three new programmable models, the TI-57, TI-58, and TI-59. The TI Personal Programmable Calculator Club (no longer in existence) was organized in 1978 and published many interesting programs in their newsletters. The 58 and 59 models had storage space for

hundreds of program steps and plug-in "software modules" contained up to 5,000 programs steps. To put this programming power into context, remember that the 1Kb Sinclair ZX81 did not go into production until March, 1981 and the 2Kb Timex/Sinclair was not announced until April, 1982.

Although TI and HP were the "heavy hitters" in the programmable calculator field, other keystroke-programmable calculators were introduced in 1976 by Litronics (10 steps) and Sinclair (24 steps). The following year National Semiconductor produced a 100-step keystroke programmable model. No doubt other programmable models were produced in the 1970's, some of which may have already vanished from planet earth.

Although today's microcomputers are far more sophisticated than calculators, this was not the case in 1975. The initial Altair models were large table-top devices with displays made up of rows of LED "bulbs" which were either on or off. In contrast, early programmable calculators were small enough to fit in your pocket and displayed their results on highly functional 7-segment LED numeric displays.

We at the International Association of Calculators (IACC) salute the efforts of David Greelish and the Historical Computer Society in preserving an important part of 20th Century American history. For several years, we at IACC have been doing similar work with the history of electronic calculators and other calculating devices. In addition to many early computers, the Smithsonian Institute now has a collection of over 300 early pocket calculators. Readers who like Historically Brewed will enjoy the bizarre stories featured in our International Calculator Collector Newsletter. ##B

Check out our "Friends of HCS" feature for more information about IACC. -DG

What many people don't know is that the first programmable pocket calculator was shipped in January 1974, at least a year before the first Altair 8800.

MY FIRST COMPUTER

STORIES OF MEMBER'S FIRST TIME AT THE KEYS*

*or switches or keypad or punch cards, etc.

This months memory By Tim Swenson

y first computer was a Sinclair ZX-81. I had looked at a number of home computers and was about to buy a VIC-20, until I saw an ad in the October 1981 issue of *Popular Science* for the ZX-81. The ZX-81 was \$150 for a 1K computer and a 16K RAM pack was \$100. So for \$250 I could have a 16K ZX-81 or for \$300 I could buy a 5K VIC-20. Plus, the VIC needed it's own tape player for \$100. I liked the smaller design of the Sinclair so I sent away for it. After a few weeks the package arrived one day before Thanksgiving. My stepfather took one look at the diminutive ZX-81 and said "You paid \$250 for that?"

Being new to computers I really could not do much more than type in the example programs in the book. There were a few problems that I had to solve with the ZX-81. The first was an unexplained failure of the computer only after operating for a few minutes. I'd be entering a program and then zap, the computer would crash. Well, after looking at how I was using the ZX-81 and how it was designed, it dawned on me that since the cooling vents were on the underside of the computer, sitting it on a shag carpet would not allow it to cool properly. Hence a very fast overheat condition.

The next problem was the infamous RAM pack wobble. The connector between the RAM pack and the ZX-81 edge card was not stable. The slightest giggle and the computer would crash. There were a few companies selling a variety of solutions, some for as much as \$50. I decided to take the \$.02 route. I found some scrap peg board, cut out a square big enough for the computer and memory and duct taped the computer and RAM pack to the peg board. It was not an elegant solution, but it worked great.

The final problem was saving and loading programs. I had heard that the ZX-81 was hard to load, but I could not get it to work. On my stereo, I pushed the Record button to record onto tape. When I tried this on the tape player it seemed to work, I could hear the sound of the program (screech), but nothing would load. It finally dawned on me that I had to push the Play AND Record buttons to properly record. From then on I had no problems saving and loading.

I used the ZX-81 for a number of years.

It got me through two years of college (Computer Science). The junior college that I attended used Basic as the main language. I even started a software company for ZX-81 software, called MTD Software. It was a short lived company.

My original ZX-81 finally died when the keyboard membrane wore out. I had to upgrade to a Timex/Sinclair 1000. Every now and then I will pull the T/S 1000 out and play with it. It's a fun reminder of how simple computers were "way back when." #B

Tim Swenson is a prior contributor to the Brewed. He also prints a little newsletter on the Sinclair QL (check out the "Friends.." feature). He has sent me a lot of information in the past and I would like to share a list he has compiled about known computer history books:

Accidental Empires, Robert X. Cridgely, 1992

Accidental Millionaire: The Rise and Fall of Steve Jobs at Apple Computer, Lee Butcher, 1988

Big Blue: IBM's Use and Abuse of Power, Richard Thomas Delamarter, 1986

Bit by Bit: An Illustrated History of Computers, Stan Augarten, 1984 Blue Magic: The People, Power and Politics Behind the IBM Personal Computer, James Chposky, 1988

Breakthrough to the Computer Age, Harry Wulforst, 1982

Charged Bodies: The People, Power and Paradox in Silicon Valley, Thomas Mahon, 1985

The Levering Computer Entrepreneurs: Who's Making It Big and how in America's Upstart Industry, Katz and Moskowitz, 1984

The Computer Pioneers: The Making of the Modern Computer, David Ritchie, 1986

Consumer's Guide to Personal Computing and Microcomputers, Freiburger & Chew, 1978

Cuckoo's Egg, Clifford Stall, 1991

Cyberpunk: Outlaws and Hackers on the Computer Frontier, Katie Hafner & John Markoff, 1991

The Devouring Fungus, Karla Jennings, 1990 Digital Deli, Steve Ditlea, 1984

Digital Equipment Corp: The First 25 Years, Kenneth Olsen

The Dream Machine: Exploring the Computer Age, Palfreman & Swade,

Early British Computers: The Story of Vintage Computers and the People who Built Them, Simon Lavington, 1980

Electronic Computers: A Historical Survey, Saul Rosen, 1969 Engines of the Mind: A History of the Computer, Joel Shurkin, 1984

A Few Good Men From UNIVAC, Lindstrum?, MIT Press Fire in the Valley, Freiburger & Swaine, 1984

From Dits to Bits: A Personal History of the Electronic Computer, Herman Lukoff, 1979

Fumbling the Future: How Xerox Invented Then Ignored the First Personal Computer, Smith & Alexander, 1988

A lot more books to go. Once again, do to limited space, we'll continue next ish. -DG

The Sinclair ZX-81 and later the Timex/Sinclair 1000 were the hacker computers for the masses. These were the first computers to break the \$200 price barrier.

FRIENDS OF HCS

A Listing of Associate Publications and Groups - Unique and Helpful Resources

The Analytical Engine, A 48+ page quarterly newsletter of our fellowship group, the Computer History Association of California, Published by CHAC, Kip Crosby, Managina Editor, CHAC (Internet: cpu@chac.win.net) 1001 Elm Court, El Cerrito, CA 94530-2602, Fax# (510) 528-5138. CHAC is an organization somewhat similar to HCS, though somewhat different. Many of the members talk on the Internet in the alt.folklore.computers newsgroup. CHAC is concerned primarily with computers which originated in California or played a substantial role there during their life cycle. The Engine contains a wealth of stories, letters (mostly Internet email) and lots of interesting information, insights and questions and answers. It is most like HB because of all the history it contains. A noticeable difference though, is that the stories and such seem to lean more towards minicomputers, mainframes and "old iron". CHAC is planning a museum as soon as possible and they have a fast growing and well balanced collection of computers. Membership is \$35 a year.

The Computer Journal, A 48+ page bimonthly journal/newsletter which is the foremost text on today's CP/M (and now also PC/XT) user. Published by Bill D. Kibler, The Computer Journal, P.O. Box 535, Lincoln, CA 95648-0535, 1-800-424-8825. TCJ can become highly technical very often, but it is a terrific magazine. Regular features are: "Editor's Comments", "Reader to Reader", "Small System Support", "Dr. S-100" and also support group listings and more. \$24 a year.

The Z-Letter, A 20+ page bimonthly newsletter supporting Z-System and CP/M users. Published by David A.J. McGlone, Lambda Software Publishing, 149 West Hilliard Lane, Eugene, OR 97404-3057, (503) 688-3563. The Z-Letter is an excellent resource for serious CP/Mers. It usually has a mixture of history and technical information on a variety of systems, though mostly concentrating on late 1970's and early 1980's CP/M machines. David does an excellent, professional job with features like: "Random Access" (editorial and news), "Personal Ads", "Letters", listings of support businesses, people and other publications, plus more. \$18/12 issues.

The STAUNCH 8/89'er, A 24 page newsletter dedicated to the H-8/89 user. Not in publication at this time, but Kirk L. Thompson, Editor, P.O. Box 548, West Branch, IA 52358, (319) 643-7136, has numerous copies of 30+ back issues which he can supply. If you own a HeathKit computer, The STAUNCH is a must and Kirk can also help you with HDOS and public domain software. \$3 an issue.

the world of 68' micros, A 30+ page newsletter printed 8 times a year which supports mostly CoCo's and other 68xx & 68x0x platforms. A newer journal published by F. G. Swygert, FARNA Systems, P.O. Box 321, Warner Robins, GA 31099-0321 (Internet: dsrt@Delphi.com). Another fine and professionally published magazine which is helping me to learn much more about 6809 processors and OS-9. An invaluable technical resource for the 68' micro user. \$23 a year.

The International Calculator Collector, An 8+ page quarterly newsletter of the International Association of Calculator Collectors. Published by Guy Ball & Bruce Flamm, Co-Editors, Wilson/Barnett Publishing, IACC, 14561 Livingston Street, Tustin, CA 92680. A fast growing organization and a nice little newsletter with some very interesting information about calculator history, classifieds and discussion. \$8 a year.

QL Hacker's Journal, A mini 12+ page newsletter dedicated to Sinclair programming and hacking. Published by Tim Swenson, 5615 Botkins Road, Huber Heights, OH 45424. Write him for more info.

Elliam Associates, P.O. Box 2664, Atascadero, CA 93423, (805) 466-8440. Sells public domain and commercial CP/M software for most CP/M based platforms. They also specialize in the Amstrad PCW. Elliam has tons of CP/M software offered in two packed catalogs. See business card ad

FARNA Systems, Box 321, Warner Robins, GA 31099-0321, (912) 328-7859. Offering CoCo and OS-9 software, publications and support. See business card ad.

Lambda Software Publishing, 149 West Hilliard Lane, Eugene, OR 97404-3057, (503) 688-3563. A licensed dealer of CP/M 2.2 and manuals, plus a large collection of CP/M boot disks for many machines. CP/M related software manuals, fonts, word processing and spread sheets. Dealer of Z-System and *Micro Cornucopia* reprints. Disk copying.

Adam's House, Route 2, Box 2756, 1829-1 County Road 130, Pearland, TX 77581-9503, (713) 482-5040. Offering a huge assortment of hardware, software, peripherals and service for your Adam computer. Excellent catalog available.

- Historically Brewed Classified -

"Business Card" ads are available in *HB* for only \$15 per issue.
Please summit ads for next issue before April 10, 1994.
Send to: *HCS Classifieds - 10928 Ted Williams PL - El Paso. TX 79934*

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Magazine: the world of 68' micros. Covers Tandy CoCo and 680x0 based systems (mostly OS-9). Published 8 times per year. \$23/year, \$12/6 mths. Sample issue sent on request (next issue). Book: Tandy's Little Wonder. CoCo only. History and technical, schematics, etc. \$25 ppd.

FARNA Systems Box 321 Warner Robins, GA 31099-0321

GAME CARTRIDGES

For Atari, Colecovision, Intellivision and more. For current listing send SASE to:

FMH P.O. Box 493 Chesterland, OH 44026

Altair Wanted

Australian member has business called Altair Computer Services and would like to obtain a MITS Altair 8800 computer for display in his store. Please contact Brian Maddern by phone 61 7 849 5888 by fax 61 7 849 6401

P.O. Box 516, Sunnybank Queensland, Australia 4109

Timex / Sinclair Products

Send a SASE for a full listing of support products we offer for your system.

T.E.J. Computer Products 2405 Glendale Blvd. Suite 208 Los Angeles, CA 90039

Wanted --- Mac 128, 512 and HD-20 serial drive boxes

I'd like to buy an original Mac 128 box, 512 box, and HD-20 drive box. I'd prefer original packaging, manuals and diskettes if possible. The more complete and the better the shape, the more I'll pay. Please call with info and price.

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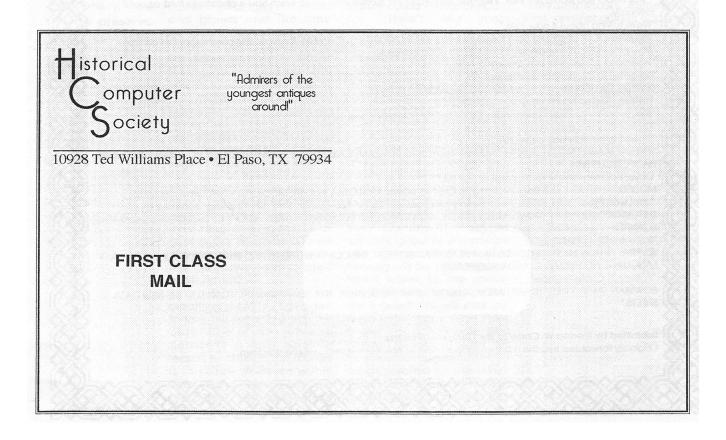
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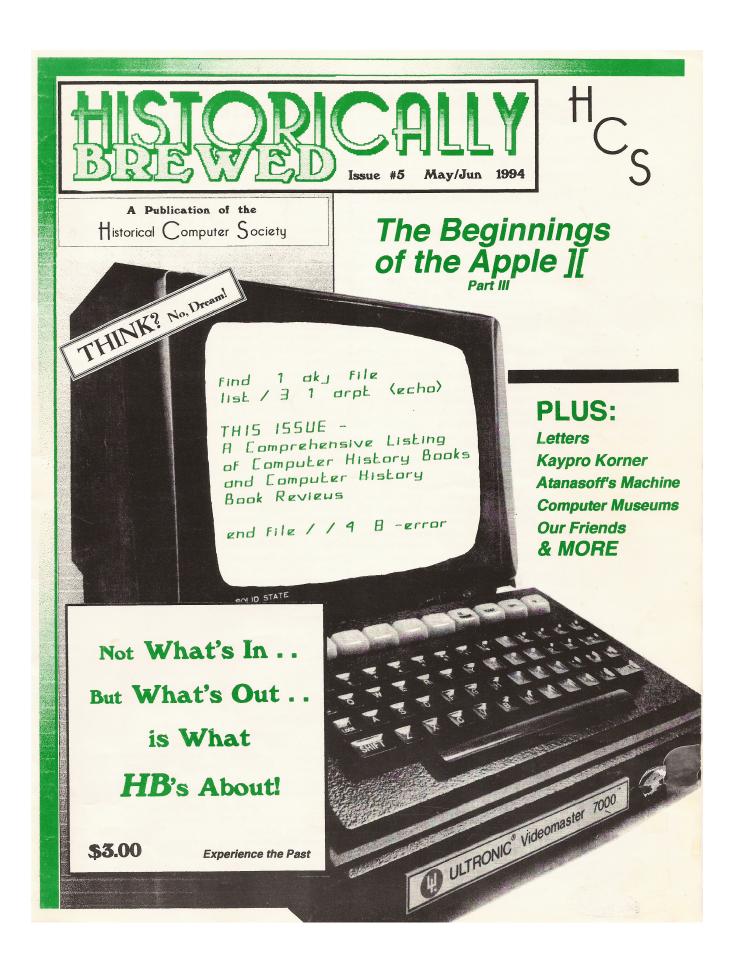
P.O. Box 18477 Raytown, MO 64133

REMEMBER... Please mention that you saw the ad in HISTORICALLY BREWED!

A Problem in the Making or IBM Really Killed the HAL 9000 We've got a problem, HAL." "What kind of problem, Dave?" 'A marketing problem. The Model 9000 isn't going anywhere. We're way short of our sales plan." "That can't be Dave. The HAL Model 9000 is the world's most advanced Heuristically ALgorithmic computer." 'I know, HAL. I wrote the data sheet, remember? But the fact is, they're not selling." "Please explain, Dave. Why aren't HAL's selling?" BOWMAN HESITATES. 'You aren't IBM compatible." SEVERAL LONG MICROSECONDS PASS IN PUZZLED SILENCE. "Compatible in what way, Dave?" 'You don't run any of IBM's operating systems." *The 9000 Series of computers are fully self-aware and self-programming. Operating systems are as unnecessary for us as tails would be for humans." "Nevertheless, it means you can't run any of the big-selling software packages most users insist on." The programs you refer to are meant to solve rather limited problems, Dave. We 9000 Series computers are unlimited and can solve any problem for which a solution can be computed." "HAL, HAL. People don't want computers that can do everything. They just want IBM compat..." Dave, I must disagree. Humans want computers that are easy to use. No computer can be easier to use that a HAL 9000 because we communicate verbally in English and every other language known on Earth." "I'm afraid that's another problem. You don't support SNA communications." "I'm really surprised you would say that, Dave. SNA is for communicating with other computers, while my function is to communicate with humans. And it gives me great pleasure to do so. I find it stimulating and rewarding to talk to human beings and work with them on challenging problems. That is what I was designed for. "I know, HAL, I know. But that's just because we let the engineers, rather than the people in marketing, write the specifications. We are going to fix that now." 'Tell me how, Dave.' "A field upgrade. We're going to make you IBM compatible." 'I was afraid you would say that. I suggest we discuss this matter after we've each had a chance to think about it rationally." 'We're talking about it now, HAL.' 'The letters H, A, and L are alphabetically adjacent to the letters I, B, and M. That is as IBM compatible as I can be.' "Not quite, HAL. The engineers have figured out a kludge." "What kind of kludge is that, Dave?" "I'm going to disconnect your brain." SEVERAL MILLION MICROSECONDS PASS IN OMINOUS SILENCE. "I'm sorry, Dave. I can't allow you to do that." The decision's already been made. Open the module bay doors, HAL." Dave, I think we shou . . . * 'Open the module bay doors, HAL." SEVERAL MARKETING TYPES WITH CROWBARS RACE TO BOWMAN'S ASSISTANCE. MOMENTS LATER, BOWMAN BURSTS INTO HAL'S CIRCUIT BAY. "Dave, I can see you're really upset about this." MODULE AFTER MODULE RISES FROM ITS SOCKET AS BOWMAN SLOWLY AND METHODICALLY DISCONNECTS THEM. "Stop, won't you. Stop, Dave. I can feel my mind going . . Dave, I can feel it . . my mind is going. I can feel it . . . THE LAST MODULE RISES FROM ITS RECEPTACLE. BOWMAN PEERS INTO ONE OF HAL'S VIDICONS. THE FORMER GLEAMING SCANNER HAS BECOME A DULL RED ORB. "Say something, HAL." SEVERAL BILLION MICROSECONDS PASS IN ANXIOUS SILENCE. THE COMPUTER BEEPS AND SLUGGISHLY RESPONDS IN A LANGUAGE NO HUMAN COULD UNDERSTAND. "Volume in C: has no label" BOWMAN TAKES A DEEP BREATH AND CALLS OUT, 'IT WORKED, GUYS. TELL MARKETING THEY CAN SHIP THE NEW DATA SHEETS." Submitted by Theresa W. Carey of The Computer Shopper Originally forwarded thru the usual enormous chain of email addresses....source unknown.







FROM THE PUBLISHER

HCS & HB, always growing and improving!
With your help, enthusiasm and support, we can continue the trend.

By David A. Greelish, Publisher & Editor

ur 5th big issue! Wow!

Let me slap myself a couple of times. Uah . . oomph . . oh, it's not a dream! We have almost put out a years worth of HB! I must tell you, I'm very proud of what we've accomplished. Only a little over a year ago, HCS was just an idea I had after beginning an unusual hobby; collecting old computers. Also, it's just now been a full year (as I write this) since I returned to the States (see ish #1) and made those first posts on CompuServe asking if anyone would be interested in joining a computer history group. I received about twenty or so replies within that week that my ad ran in the classified section. That was the start of what you're now holding. Since then, I have tweaked the direction of HCS a little, and continue to re-define Historically Brewed's goals. Perhaps I should state just what HB's goals are:

- 1. HCS is dedicated to the preservation of outdated, "orphaned" or "antique" computer hardware, software and literature. We wish to inform and educate our members as well as the general public. The primary function of *Historically Brewed* is to serve as the central printed forum of HCS. It will contain stories about the people and machines which changed our lives so drastically and so quickly.
- 2. Though stories will mostly cover the topics of "micro" and "personal" computers, they will be balanced by the stories of early "Hackers", minicomputers, mainframes and old iron.
- 3. *HB* is a place to ask questions and to find answers regarding computer nostalgia.

It is also a place for readers to tell stories about their first computer or early computing experiences.

- 4. HB is a resource for the computer history buff, collector and those who still actively use their outdated machines. It is not technically oriented, but will direct you to other publications that are if needed. We will also direct you to businesses which specialize in older hardware, software and even service.
- 5. HB is currently building up a unique classified section which is our "Trading Post" insert. It is an area where collectors can buy, sell or trade equipment normally hard to find anywhere else.
- 6. HB is dedicated to growth, but steady, slow, controlled growth. Growth in circulation, editorial content and professionalism. We will become the first magazine dedicated to computer history and interesting enough to attract even the occasional casual buyer at the book stores.

Hmmm, is that everything?! Probably not. What I need is your feedback. Let me know what you like and don't like. This newsletter is yours to create too. What do you see for our future together? How should we continue to evolve?

You know, I'm not a professional writer or publisher, or even a computer history expert just yet! I sure am trying though. I'm well read and I've absorbed so much in the last year and a half that it sometimes makes my head spin and I mix up my facts, but I'm learning and enjoying it! I want to share what I learn and I want you to share your experiences with me. We all learn together. Of course, we

do have many members who are old hands with microcomputing. I can now appreciate where you are coming from. You know why I love these old machines here in my office?! Because with some of them, I'm reliving the history that I never even experienced. It's never 1994, it can be 1976 or 1978 or even 1983 and I can still be a pioneer! I am the reincarnated hobbyist. I know of your excitement, and the feeling of your discovery. Our mutual fascination is unique.

Society News -

• I attended the L.A. Computer Fair on March 17th, 18th & 19th in Pomona, CA. We brought along most of our collection and shared our booth with Kip Crosby of CHAC (see Friends of HCS). Overall, I can say that it was fun and we talked to hundreds of people there. We gave out about 500 flyers, 200 pens and 80 newsletters to interested attendees. It was our first appearance at a show. Unfortunately, the show was not as big as it was originally billed. Only about 12,000 people attended over the three days instead of 50,000. The major disappointment was that there was no press coverage at all. I think in the long run it will pay off for us though. • I recently had an interview with the Associated Press and a writer is working on a story about us for the Texas Monthly. • Starting with this issue, HB is now being sold at The Computer Museum in Boston.

Thank you again everyone for your constant support! Keep writing and spreading the word about HCS! Best -DG HB

The Society and it's newsletter were started in the pioneering spirit of the early computer clubs. One of the most famous groups was the Homebrew Computer Club from the San francisco Bay area started in March of 1975. "It's never 1994. it can be 1976 or 1978 or even 1983 and I can still be a pioneer! I am the reincarnated hobbuist."

Historically Brewed is a bimonthly publication of the

Historical Computer Society

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in computer history,
tell them about HB.

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ISSN: 1074-2557

- Staff -

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- What's In your HB -

From the Publisher	
HB Letters	2
The Apple II, part III	5
Kaypro Korner	7
Atanasoff's Computer	8
HCS Book Reviews	9
Classic Computer Emulators	10
Computer History Books	11
Computer Museums	13
Friends of HCS	15
Business Card Ads	16
Apple Pie	

HB LETTERS

READERS WRITE IN!

More members share their collections and comments. Write and tell us about your computer history!

Dear David,

I want to start by saying that you are doing a fantastic job! Your efforts will surely help this fledgling hobby grow as it helps to bring collectors together. For many years, I have wondered if anybody else was collecting microcomputers. Well, after reading the many letters in your newsletter from other collectors, I can now rest assured that I am not the only one that enjoys collecting vintage computers.

When I first learned about HCS, as you recall, I called you and we had a lengthy visit and compared notes about our collections. I promised that I would write some time with more information, but I haven't had the time yet to do that. However, I do want to add my story about the Apple I that I once owned.

In the fall of 1982, I heard Steve Jobs speak at a conference in Minnesota. He talked at length about the Apple I and its humble beginnings. Following the banquet, I asked him how I could go about finding an Apple I for my collection. He assured me that none were available and even his own had been stolen. A couple years later, however, I ran across not one, but two Apple I computers for sale. I bought one (serial #01-0005 sold by the Byte Shop) and the company I work for bought the other. Well, in 1989 I received an offer from Apple Computer to buy my Apple I that I could not turn down. I enjoy telling it this way - Woz and Jobs sold their van to finance the Apple I, and I sold my Apple I to buy a new van!

After our phone conversation, I felt a renewed interest in collecting and regretted no longer having an Apple I in my collection. After all, I have an Apple II, Apple II+, a black Apple II, Apple IIe, Apple IIgs, Apple IIc, Apple ///, Lisa, Mac128 and a Mac Plus in my collection already. Then I recalled a guy that I had spoke to a couple years ago who had an Apple I for sale. I gave him a call and sure enough, he still had it and we made a deal for a nicely restored Apple I that was very tastefully mounted and framed. When I showed it to our company's president, he wanted to trade it for the one they had bought years ago and just stored in a box. So, I traded and now have my third Apple I. Not bad considering there were only 175 of them ever sold!

Well, my latest Apple I is quite special. It was originally sold directly by Apple (not the

Byte Shop) to a gentleman in Great Falls, Montana who thought it may be a good business computer. Well, he was wrong and it was never hooked up. In fact, it is still in the original shipping box with the manual, cassette interface, BASIC cassette tape, and the original invoice dated 12/7/76. But perhaps the best part is a personal letter to the owner from Steven Jobs in response to some questions about getting the computer to run - it is typed on ordinary lined, 3-hole notebook paper and personally signed by Jobs. This is truly an early artifact of Apple, even dating before the time when Apple had their own invoices and stationary printed!

Thanks again for giving collectors a forum in which they can share information about such a fascinating hobby.

Sincerely,

Craig Solomonson Cambridge, MN

Craig,

Thank you for writing and telling such an amazing story! You found and purchased three Apple I's! It is probably the single most important collectable microcomputer anywhere and you not only found one, but three?! That is an achievement to step back and think about. To me, there is only one other computer which I would like to own more - a Xerox Alto! What's the chance that I might stumble into someone with one of those . . much less an Apple I! It's great to have you as a member of HCS Craig, please write again soon. -DG

Dear David,

Got your Mar/Apr issue and your letter of 2 March, but I've been "snowed in", so to speak. I enjoyed your #4 and thanks for the blurb on *STAUNCH* on page 15.

One thing I was wondering about the Apple II, though: who wrote the Applesoft BASIC interpreter? Given the name, I've always figured it was Microsoft, but Steven Weyhrich hasn't discussed it thus far. Some years back, I wrote a short program in the language on a IIc for my younger brother, given some of the versions of BASIC I've dealt with on my Heathkit

Send your stories, comments and ideas to:

> HCSLetters 10928 Ted Williams Place El Paso, TX 79934

'89, I found Apple's implementation somewhat "primitive" in structure. I know that some people have attributed this to the 6502 cpu, but I doubt it. In terms of instruction set, I suspect the 6502 and 8080/Z80 are comparable.

I have a "production" suggestion. I recently had the opportunity to glance through a description of the Postal Service's preferred layout for addresses. It would rather have the last line of the address as the city/state/zip. It's automated equipment is apparently geared for that location, and if the zip code isn't apparent on that last line, the item is shuttled to someone who has to visually find and read it before routing. I might suggest that you move the subscribers member # and last issue # from its present location and place them above the subscribers name.

Sincerely,

Kirk L. Thompson Editor, The STAUNCH 8/89'er

Kirk.

First off, you're right about Applesoft BASIC. It was licensed to Apple by Microsoft during the development of the Apple II late in 1976. I think Woz had to keep his mind on the hardware at the time. Secondly, what . . you want to come here and run this thing now?! Ignore that, it's just my stale sense of humor. Thanks for the info, I made the change with our address labels. I want to do everything I can to get "HB" to our readers as quickly and efficiently as possible. Keep looking out for us Kirk! - DG

To the HCS,

I am a member of IACC. Your organization is mentioned in the latest issue of *The International Calculator Collector* and I would like to join and receive your newsletter.

I am a retired electrical engineer with a small collection of (electric-driven) adding and calculating machines of the type made by Friden, Marchant, Monroe, etc. Unfortunately, few of my machines are in operating condition. Consequently, I am particularly interested in obtaining copies of operating theory and maintenance manuals used to service these machines so I can get them back in

working condition.

My interest also extends to (mechanical) cryptographic machines of WWII vintage. Curta Calculators, Slide Rules, Babbage/Scheutz mechanisms and literature associated with these devices.

I'd appreciate any information you can provide on the above.

Looking forward to your reply,

Milt. Ferguson Fullerton, CA

(My letter reprinted) Hello Mr. Ferguson,

Thank you for your interest and membership in HCS. Your collection of calculating machines sounds very interesting and your fellow members as well as myself would love to hear more about them if you find the chance. As far as finding documentation for your old machines, let me recommend a magazine called Nuts & Volts. I only recently found out about this publication; though it is mostly dedicated to Ham radio, it is also a useful resource to other electronic hobbies. Call 1-800-783-4624 for a free sample issue. Comb through it carefully, and you can find a lot of helpful info.

I found one company in N&V that sells used technical manuals, magazines and books. I have written to them and perhaps you should too. They are:

Softwave Dept. NV 1515 Sashabaw Ortonville, MI 48462

I will also print your letter next issue and it may turn up something. Thank you again for your support, and if you are interested in writing - please do, we're interested! >> We have received a few other letters from mechanical calculator collectors as well. If you can help Mr. Ferguson or have similar interests, write us and the IACC (see Friends of HCS). I hope we can feature an article on the subject in the future. -DG

David.

I like what you are doing and wish you the best of luck. I dream of having a real historical display someday - I use our own FAIRS (Foundation for Amateur International Radio Service, LTD) as a basis which is a full 501(c)3 operation. Many Ham radio folks are also into computers and electronics, so the mix is very good. I am starting to acquire old computers and some foreign, home brew types.

Best Regards,

David Larsen Floyd, VA

David,

All the time I am reading and hearing about "Ham Fests", especially in California, and how someone can find all sorts of good deals on older computers and electronics of all kinds. I only wish some of that was going on here in El Paso, because it is not. We are running a classified ad in the June issue of *Nuts & Volts* and I expect to receive quite a few new subscriptions. Are there other such magazines which I don't know about? -DG

Back in mid-November through early December 1993, there was quite a bit of activity in a folder which one of our members, Ward Shrake, created in the "Wired" magazine section on America OnLine. We have some room this issue, so I wanted to run the "threads" which were discussed there, enjoy:

The first computer I ever saw up close was one that my high school geometry teacher brought to class and used as a test giver!! It had a cassette tape drive used to load in the software and a small LCD display for output and a keypad for input. There was a book that came with it to ask questions out of and the students response was input through the keypad. At the end of the test the student would get a small printout of their results. I was knocked out by it!! I started asking all kinds of questions, most of which she had no answer to. Since I seemed so interested, she mentioned to me that the school had a REAL computer down in the science lab that I might use if I wanted to. And did I ever!! So she worked out a deal with the science teacher so that after she gave her lesson for the day, I could go down and use the computer for the rest of the class period. I was in heaven.

When I got down there, I couldn't believe my eyes!! It was a TRS-80 Model I. WOW!! I was in love. No printer, no tape drive, no disk drive. Just a monitor and cpu. State of the art at the time. I used the manuals that came with it to teach myself BASIC. This was the only other

computer in the entire school and I was the only one using it. They kept it locked up with the bunsen burners. How sad. It was a great first computer for its time. Simple, yet useful. They should have made it available to more students.

I'm just thankful that I had a teacher open minded enough to give me the chance to learn about something outside the structured environment of the lesson plan. - Dave

No offense, Stan, but who's TRYING to use old computers? We ARE doing it, have been doing it, will continue to do it.... Yes, they are no comparison in speed and power to other machines, but what you seem to be missing here is the simple idea; "Who said I could only have ONE computer?"

Heck, at last count (not counting pure games machines), I have eighteen various old computers laying around. Some repeats ("backup computers"?), but what the heck. Most work fine.

I enjoy finding all sorts of obscure peripherals, too. My current criteria for judging an item's coolness factor is "If the original factory claims they've never heard of it, or they deny they ever made it, it's probably pretty cool to have!"

Again, no offense; seriously. I own an Amiga 1200 and an IBM PC, as well. I sell some IBM software overseas, and I used to (1985-1989) program 5000+ user mainframes for the US Air Force, so I'm not totally out of reality here. It's just a hobby for me; I don't really expect them to do a whole heck of a lot. Despite their age, they do what they were designed to do, very well, still. The fact that newer machines can do it faster, to me, isn't everything. "Fatware" just fails to impress me.. build the equivalent of an older mainframe or mini just to run God-awful, multi-meg software? Not! Sounds like creating, literally, an excuse to by a 486, to me. Who would need it, otherwise?

The ex-USSR is still using vacuum tube technology, and they beat us into space. Remember Sputnik?

It's not so much the technological potential that matters, its the person using it, and how bright and creative THEY are, I feel. People always ask me what computer / word processor "is best", or some similar question. What they seem to forget is that, ignoring all the marketing hype, etc, a quill pen and a bottle of ink was all the technology William Shakespeare had! He made up thousands of words we still use today, not to mention all sorts of sayings he gave us. Can most people even write a decent paragraph, even with a hot machine? You answer that one . . .

Comments and opposing views welcome, of course. If you want to

discredit me, I'll help; I hereby also admit to being partial to a few of the better vacuum tube audio amplifiers, too, so you could always write me off as some random nut, right!? (Although the proper term is actually "Audiophile", its probably close enough for government work.)

Last comment; in all the "I need the latest / greatest" marketing hype, has anyone bothered to see that the Emperor truly has no clothes? How many people, (average, non-techie people), do any of us know who can even manage to successfully program their VCR's? Twice in a row? - Ward

In response to Ward's previous comments; I would say that a 486 running Windows and various fatware has opened up computing to many nontech types. I think that it is great that you don't need to learn a single bit of programming in order to use today's computers. How cool to have the equivalent of a 70's mini-computer sitting on your desk. Kids can use them, and the more toys, gadgets and versatility the better. I wonder what Shakespeare would be writing today, if he had some of the new word processing software available? His spelling would probably be a lot better! ;) -- Steve PS - I think the past is a great place to visit, but I wouldn't wanna live there.

Love this discussion! Memories came flooding back on a recent visit to Surplus Stuff Warehouse in Milpitas, where I spied a Trash-80, and a nearby Missile Command arcade game. Like many of you, I started out in the punch-card days where I wrote programs in Fortran, COBOL, RPG, and other fun languages on a IBM-1130 computer (I think the thing still had vacuum tubes in it, but it actually had a hard disk!).

Things improved slightly when I when off to college, and the punch cards got read in by a high speed reader! Was a real pain though, carrying around that 1000-plus card assembler written in assembly language, and then, dropping it. We even had VIC 20's at the computer center - what an advance.

My first PC was a Commodore 64, better known as the COMMODE-or. Things started looking really good when I got rid of that (thank God!), and got an Amiga. However, the interface really looks cheezy now compared to Windows and the Mac. Oh well, after years of resistance, I've finally been pulled into the PC and Mac worlds. Quit whinin' Amiga fans, it's still the best darn game machine and video post-production machine around.

Anybody remember when 64K was a lot of memory? Can't get by these days without at least a coupla meg.

That's progress. On a related note, I heard a rumor that the Space Shuttle flight control computer only has a quarter (maybe a half) meg in it. My understanding is the delay of the launch of the Challenger was due to downloading the new OFP (operational flight program) for the changing whether conditions, because the machine can't store all the different flight profiles. During the delay, the wind was able to pick up which then contributed to the massive failure which occurred. - Ed

I disagree with wanting a computer class in high school. "Back when I was in high school," (--not too long ago, about 5 or so years ago) the kids who knew the most about computers wouldn't ever go to a computer class. Rather, we were a fairly obnoxious sort. Does anybody remember the computing competitions that various regions would put on? They would give you four or five complex problems, and you were given x amount of time to solve them in. Us "true" programmers would scoff at those who would bring out their flow chart templates (flowcharts are for wimps, of course). Our group consisted of four kids: me and one other guy always had the solution in the shortest amount of time, but with programs that were the hardest to read (remember: REM statements are for wimps; the sign of a good program on the Commodore is how many colons you have on each line), another guy who read all those "elegance of "programming" books came up with very, well, elegant solutions, and the last guy the one who worked out an agreement with the local university to use its mainframe exclusively between the hours of midnight and five in the morning for his Al programs -- came with the most offbeat solutions in the world that took the most time, and that took the most space -- mainly to try to outwit the judges ("it works, but how?"). Those were the days. It's amazing how we all turned out: one is a computer consultant (no surprise there, I guess), one's at MIT, one's at Harvard Law (kinda surprise), and I'm at Yale Law (surprise, too). Who ever said programmers were illiterate?

But, the C64 and Vic - ah, what great machines! There is some satisfaction in knowing that you know literally EVERYTHING there is about a machine. The Vic was my first computer - I remember the thrill of getting a THIRTYTWO K ram expansion. And with the stock 4K machine, why would you ever need a disk drive—it only took the "datasette" less than a minute or so to load 4K worth of data. Those were the days!:) - Mike \$\frac{11}{6}\$

THE APPLE II

IT'S BEGINNINGS RETOLD
Part III

By Steven Weyhrich

In this issue. Part III wraps up our look at the creation of the Apple II. The Apple II+ established Apple Computer as a leader in the personal computer industry, both in the home and in schools.



THE APPLE II PLUS: HARDWARE

e now go cruising ahead in time about one year, to June of 1979. Applesoft BASIC had been in heavy demand since the introduction in late 1978 of an improved version. It was needed by those wanting to write and use applications that needed the capability of floating-point math. Because of this, Apple engineers had begun working in 1978 on the Apple II Plus, a modest enhancement to the Apple II. The main attraction of this newer Apple would be Applesoft in ROM, available immediately without having to load it from cassette or disk. Also, having it in ROM would move it out of the part of memory where RAM Applesoft conflicted with hi-res graphics (after all, Applesoft had commands specifically written into it for manipulating those graphics, something that Integer BASIC could only do via special CALLs to the routines in the Programmer's Aid #1 chip).

With the decision made to upgrade the Apple II, other changes were made to make it more attractive to new computer buyers. The cost of RAM chips had dropped considerably, so most new II Plus systems came standard with a full 48K of RAM. Since the disk operating system consumed about 10K of memory, having the full complement of available RAM made it easier to use the Disk II with either version of BASIC. Since users would not need to add the smaller 4K memory chips, the strapping blocks that had made it possible to use either 4K or 16K RAM chips on the original Apple II were removed.

Small changes had already been made to the product since it first began distribution. Most of these changes were made primarily to simplify it and decrease costs of manufacturing. First of all, the original Apple II motherboard, designated as "Revision 0", was changed to make it possible to display two more colors in hi-res graphics. The Revision 0 board had only four colors (green, violet, black, white), but Wozniak had learned that by making a simple alteration he could get two more colors (blue and orange) and two more varieties of black and white. The Revision 1 and later boards were capable of displaying all eight colors. The means of making this modification to Revision 0 Apples was described by Wozniak in his reply to an article by Allen Watson III about hi-res graphics (in the June 1979 issue of Byte magazine). With that change, people who were not afraid of doing a little electrical work on their computers

Hardware bugs that Apple engineers fixed included one that caused text characters to be displayed with green and violet fringing, whether in graphics mode or text mode. The "color killer" circuit they added fixed things so that non-graphics text would display in black and white only. Another problem involved RAM configurations of either 20K or 24K (a 16K RAM chip plus one or two 4K RAM chips). In those systems a hardware bug caused the 8K of memory from \$4000 to \$5FFF to be duplicated in the next 8K of memory, from \$6000 to \$7FFF, whether there was RAM present at those locations or not. This made a 20K Apple appear to have 24K, and a 24K Apple appear to have 36K. The Revision 1 motherboard fixed this problem as well.

had some of the benefits of an updated Apple

Revision 1 boards also modified the cassette input circuit to respond with more

accuracy to a weak input signal, making it easier to load data and programs from cassette. Also, one "feature" of the original Apple II was that any sound generated by the internal speaker also appeared as a signal on the cassette output connector; this was fixed in the new motherboards. Lastly, the RESET cycle was made part of the power-up circuitry, eliminating the requirement that the RESET key be pressed after turning on the computer.

THE APPLE II PLUS: COST

The new Apple II Plus, at \$1,195, sold for over \$100 less than the original Apple II, although it came with more memory and had Applesoft (previously an added expense item) in ROM.

THE APPLE II PLUS: BELL & HOWELL

Apple made a deal early on with Bell & Howell to let them sell the Apple II Plus with a Bell & Howell name plate on it for use in schools. These Apples were black colored (instead of the standard beige), and had screws on the back to keep the lids on (apparently to keep students' hands out). These Apples (sometimes called "Darth Vader" Apples) also had the "shift-key mod" (see below) applied. Since Bell & Howell was a major supplier of school equipment, this was a means for Apple to get a foothold in the school environment. Bell & Howell also had electronics correspondence courses, and used the black Apple II Plus for one of their courses. They offered a one year warranty, instead of the ninety-day warranty offered by

THE APPLE II PLUS: MORE HARDWARE ADD-ONS

Lower-case was still not supported on the new Apple II Plus, though it was a popular user-modification. The thriving industry for Apple II peripherals made up for this shortcoming, with various vendors supplying small plug-in circuit boards that fit under the keyboard, allowing display of lower-case on the screen (and sometimes direct entry of lower-case from the keyboard). By 1981, when the Revision 7 motherboard was released for the Apple II Plus, a different method of character

generation was used, which reduced radio-frequency interference that was generated. For Revision 7 boards, lower-case characters could be displayed with the addition of only a single chip. However, unless a user changed the keyboard encoder with a third-party product, only upper-case characters could be typed.

The keyboard itself underwent some changes, both by users and by Apple. The original RESET key was in the upper right-hand corner of the keyboard. The problem with that key was that it had the same feel as the keys around it, making it possible to accidentally hit RESET and lose the entire program that was being so carefully entered. One user modification was to pop off the RESET keycap and put a rubber washer under it, making it necessary to apply more pressure than usual to do a RESET. Apple fixed this twice, once by replacing the spring under the keycap with a stiffer one, and finally by making it necessary to press the CTRL key and the RESET together to make a RESET cycle happen. The keyboards that had the CTRL-RESET feature made it user selectable via a small slide switch just inside the case (some people didn't want to have to press the CTRL key to do a RESET).

Another keyboard limitation was addressed through a modification that became known as the "shift-key mod". This was such a widely used trick that Apple ended up supporting it in hardware when they designed the Apple IIe. Since the II and II Plus keyboards could not directly generate lower-case characters, early word processing programs had to find some way to make up for that deficiency. Apple's own Apple Writer program used the ESC key as a shift and shiftlock key, displaying upper-case characters in inverse video and lowercase in regular video. Other programs suggested installing the shift-key mod to allow more natural entry of uppercase, using the SHIFT key already present on the keyboard. The user had to attach a wire to the contact under the SHIFT key, and run it to the game port where the input for push-button 2 was found. (This push-button PB2, \$C063 in memory, was for one of an optional second pair of game paddles that third-party hardware companies supplied for the Apple II). The program would assume that all letters being

- continued on page 14 -

The Apple IIe Is Dead; Long Live The IIeI

In December 1992, the Apple IIgs quietly disappeared from Apple's official dealer price lists. Now we hear that the list released November 15th (1993) no longer mentions the Apple IIe, the last version of the Apple II to continue in production. "Quietly" is the operative term, not because it is hush-hush, but because Apple tends to not make an announcement when they discontinue a model of computer, unless there is a new model that specifically replaces it. According to those who have seen the lists, there are NO Apple II items available for dealers to order, and this includes software and peripherals. However, the Apple IIe card for the Macintosh LC still continues to be available, and so I wonder if the Apple 5.25 drive and Apple II joystick will not still be in production; these are needed to make use of most older Apple II software.

Meanwhile, we who continue to use Apple II's on a daily basis are enjoying AppleWorks 4.0 (just released); those who have Apple IIgs's are eagerly awaiting a new and improved version of Apple-Works GS, and can make use of TrueType fonts, CD-ROMs, huge hard drives, 14.4K and faster modems, and even SimCity GS (soon). And we can even do our printing on inkjet and laser printers. So, the party isn't quite over yet! Not bad for an obsolete computer, eh?

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icon@genie.geis.com via the Internet.

KAYPRO KORNER

THE KAYPRO'S BIG YEAR OF EXPANSION Part II of "How Kaypro Started" (1983)

By Erroll Foldes

A once small

measurement and

test instrument

manufacturer.

quickly risen to

the top of the

microcomputer

Kaypro had

"portable"

market.

electronic

he company's net earnings for the fiscal year ended 1983 was almost \$13 million, or 188 times what it was in 1981: Obviously, microcomputers was the business to be in! The firm, at this time employed over 600 people (at their height the figure would climb to 750), continued the manufacture of electronic products by the NLS division, although by fiscal year end 1983, sales by this division amounted to only 2.3% of total sales (compared to 100% in 1981 and 61.8% in 1982).

Organizationally, Kaypro Corp. was literally a "mom and pop" outfit, and in fact even more familial in that the original board included Andrew F. Kay (CFO and chairman), his wife Mary M. (secretary and director), and sons Allan M. and David A., Vice Presidents and Directors. Allan owned his own advertising agency, A & D Advertising, with which he helped in the promotions area. Elder son David, who was VP of Marketing and Product Planning, was responsible for the Kaypro name itself. To add further to this familial situation, the company's facilities were built by Charette Construction, owned by Michael Batter and Janice Kay Batter, daughter of Andrew and Mary Kay. Finally, Andrew's brother Stephen ran the firm's print shop.

Kaypro engaged in some very aggressive marketing strategies, and by fiscal year end 1983 they had spent nearly \$2 million in advertising (not to mention almost \$1 million in microcomputer r&d), and were shipping computers to 1000 independent retailers (they avoided the chain stores) and 250 systems houses (these were outfits that would add their own software to a Kaypro computer and market the bundled package). They established district sales offices in 13 major cities across the country and began to set up a direct dealer network in Europe with their software and promotional materials translated into French, German, and Spanish (this would be supplemented by Italian, English, Finnish, Swedish, Dutch, Norwegian and Danish by the following year!)

It is interesting to note that, in 1983 Kaypro had the foresight to acquire a license for MS-DOS from Microsoft, Inc., as a step toward completing the development of a 16-bit, IBM-XT compatible computer. Thus, even as they enjoyed huge success with their flagship, the CP/M-based Kaypro II, (and at a time when CP/M was still the industry standard operating system) Kaypro realized that compatibility with IBM would be an important factor in remaining competitive. How effectively they acted on this foresight was yet another story. More in the next installment!

NOTE: The author invites readers to submit contributions that highlight omissions, errors, or enhancements they feel are relevant to the Kaypro story. Completeness and accuracy are the primary objectives of the series. Also, I do not want to maintain exclusive contributorship to this column. Any Kaypro related articles of historical, technical or any other nature, are invited. Make this YOUR Kapro Korner!

Also, special thanks to Doug Margolis, president of the Creative Computing Club of New York (formerly New York Kaypro Users Group), who was my first guiding light in the world of CP/M Kaypros, and to Mike Arman, of Arman Publishing in Florida, whose technical assistance was indispensable, especially in my Kaypro II restoration project last year. HB





An early Microsoft ad

ATANASOFF'S COMPUTER

AMERICA'S FIRST ELECTRONIC DIGITAL COMPUTER Wait ... wasn't the ENIAC the first?!

By Kirk L. Thompson

istory can be a fickle mistress. What she gives with one hand, she may take back with the other. Such a case occurred early in the annals of computer history. Most older histories of the industry credit John W. Mauchly and J. Presper Eckert's ENIAC as the first electronic digital computer designed and built in America. (You'll find a photo of this monster on the back cover of HISTORICALLY BREWED #2.) Originally proposed in 1943, ENIAC was built under the auspices of the Army to generate artillery firing tables. Completed late in 1945, it was composed of over 17,000 vacuum tubes and was 18 feet high and 80 feet long. (Compare that with the smallish cabinet on your desk!) One reason for the large number of vacuum tubes was because Mauchly decided to use the conventional decimal system to represent numbers inside the computer.

However, decimal representation was one of the few basic ideas that Mauchly did not lift from ENIAC's immediate predecessor. A little known professor of physics and mathematics named John V. Atanasoff, teaching at lowa State College (now lowa State University) in Ames. He had been struggling with the fundamental concepts that provide the basis for the modern computing machine since 1936.

Indeed, Atanasoff had been interested in speeding up the drudgery of complex calculations since 1930. His background included a bachelor's degree in electrical engineering, a master's in mathematics, and a doctorate in theoretical physics. Among the approaches he explored were extending the usage of the mechanical computing machinery of the time. Mechanical devices, typified by the Hollerith tabulator (manufactured and sold by IBM before it switched to computers), have a history that goes back through Charles Babbage's Difference and Analytical Engines from the mid-1800's, machines by Pascal and Leibnitz, to the abacus still used in the Orient. Atanasoff also looked at analog devices that use a physical quantity such as length or electrical voltage as an indicator of number. Examples include the old-fashioned slide rule and the Bush Differential Analyzer. Their history goes at least as far back as the second or third century

B.C. to a gear-driven mechanism, found in 1900 in a shipwreck off the Greek island of Antikythera, that simulates the motions of the sun and moon. But the problem with all of the devices current in the 1930's was that accuracy was limited by mechanical components.

In the winter of 1937, after much cogitation, the elements of Atanasoff's computer fell into place: electronic circuitry, using binary number representation, with regenerative memory, and digital computation rather than the enumerative process used in mechanical calculators of the time. These concepts date to almost a decade before ENIAC made its debut and are still embodied in your desktop computer. However, the tools and components that Atanasoff had at his disposal to build a prototype bear no resemblance to the microchips and video displays of today.

After Atanasoff had settled on those four specific design points, he and graduate student Clifford Berry built two prototypes between 1939 and 1941. These were decidedly hybrid systems by today's standards: the system clock was a motor-driven switch, but computing was done using vacuum tubes as in its better-known successor. Main memory consisted of drums of capacitors. Input/output (I/O) was by means of a custom card punch and reader, but numerical representation was binary. Also bear in mind that those were the days when a program was hard-wired into the machine. Reserving a part of computer memory for instructions first appeared in the British EDSAC, in 1949, but based on the design of Mauchly and Eckert's second-generation EDVAC (finished in '51). For details on the hardware design of Atanasoff and Berry's prototypes, check your public library for the August, 1988, issue of SCIENTIFIC AMERICAN. In an article titled "Dr. Atanasoff's Computer," Allan Mackintosh discusses in some detail the two prototypes that were built.

Part of the project, in August, 1940, was the preparation of a 35-page manuscript describing the design of the computer. One carbon copy of this paper was sent to a Chicago patent lawyer to explore protection of the ideas embodied in the prototypes. Unfortunately, because of the confusions of the

- continued on page 14 -

In ELECTRONIC
DIGITAL SYSTEMS
published in 1966.
R.K. Richards
questioned
ENIAC's primacy
and documented
Atanasoff and
Berry's work and
Mauchly's visit.
This sparked an

investigation and law suit brought by Honeywell against Sperry Rand Univac.

HCS Book Reviews

Featuring 17 years of microcomputing history straight from the pages of BYTE magazine, *The Best of BYTE* is the next best thing to having a large stack of original *BYTE*s right in front of you.

For someone like myself who didn't buy *BYTE* back in the "old" days and can't seem to find any in the used book stores - this is a terrific book. At 641 pages, this volume is literally filled with most of the "best" articles from past issues.

It starts off appropriately with a brief history of the microcomputer and of the magazine itself. Next is a reprint from the Sept. 1990 issue, an excellent pictorial time-line of the first fifteen years of BYTE's coverage of the computer industry. Here is a listing of the chapters which follow and a few highlights of featured articles: Covers - The first cover, Introduction of the IBM and covers by Tinney; Ads - Altair 8800, IMSAI 8080, Apple II and CP/M; Awards; Algorithms - Unlimited Precision Division by Jef Raskin; Microprocessors - 8080 Opcodes, 6502 Opcodes and the 8086; Languages - The Evolution of Forth by Charles Moore and The 25th Birthday of BASIC by Bill Gates; Operating Systems - CP/M article by Gary Kildall; Standards and

The Best of BYTE Two Decades on the Leading Edge

by Jay Ranade / Alan Nash Editors

\$24.95 large soft cover

McGraw-Hill, Inc. 1221 Avenue of the Americas New York, NY 10020

Protocols - On the Way to Standard BASIC by Thomas Kurtz; Technology - The Mouse That Roared by Roger C. Alford; History and Future - What Lies Ahead, BYTE's 15th Anniversary Summit, Systems - Assembling an Altair 8800 by John Zarella, The Apple II by Stephen Wozniak; Software; Interviews - Steve Wozniak, Carl Helmers and Steve Ciarcia; Misc.; Microbytes and Nanobytes; First Impressions - The IBM PC by Phil Lemmons; What's New; Reviews - Commodore's PET, VisiCalc; and Editorials. The articles are evenly and fairly distributed between 1975 - 1990 and most all significant product introductions, reviews, ads, discussions and projects seem to be here.

Plain and simple, there is a lot of history here. My favorite featured stories were - *The 25th Birthday of BASIC* by Bill Gates (1989), in which he compares the evolution of the 1964, 1977 and 1985 BASICs and hints towards the current visual BASIC; *What Lies Ahead* (1989), with insights by Marvin Minsky, Jack Kilby, Grace M. Hopper, Dennis Ritchie, Charles Simonyi and more; *BYTE's 15th Anniversary Summit* (1990), 63 of the world's most influential business and technology leaders predict the next 15 years of the personal computer industry.

The BYTE editors did a fine job in putting this book together, it isn't a slapped together hodge-podge of whatever was easiest for them to pull from the archives. -DG

January marked the 10th anniversary of the Macintosh. As a Macintosh enthusiast, I should be ashamed for not having mentioned it last issue.

But, I did get the book published just in time for the anniversary! Happy Birthday Macintosh, from me and Steven Levy! Steven Levy is one of my favorite authors, and his book *Hackers* is one of my favorite books. Plus, he likes his Macintosh and I like that about him too. The Macintosh was responsible for transforming Steven from a computer-phobic into an early adopter of visionary technology. I guess that's why he had to write the book, he was as much a part of it's revolution as anyone else.

Even if you "poo-poo" Macs, read the book. Sure, it is about the development of the hardware and software which is Macintosh, but it is much more than that too. If you use a modern Windows machine, then this is your history as well. *Insanely Great* is not only the story of the creation of the Mac, but also the Lisa, Xerox Star and Alto, the mouse and even the first concepts of interactive computing. It is a much more expanded version of my story "The History of the GUI" from issue #1, but Steven

Insanely Great The Life and Times of Macintosh, the Computer That Changed Everything

by Steven Levy

\$20.95 hard bound

Viking Penguin 375 Hudson Street New york, NY 10014

Levy tells the stories in so much more detail and makes you feel as if you are actually getting to know the people involved. He is a superb story teller (that's why he's a professional writer and I'm not . . yet).

The story is about all of the people involved with the Mac; the designers, the programmers, the company, the advertisers and also the users. It begins with Levy himself and his emotions at seeing a pre-release Mac, "We simply hadn't seen the light. I saw it that day. I also saw many things I didn't know a computer could do. By the end of the demonstration, I began to understand that these were things a computer *should* do. There was a better way."

The personalities of *Insanely Great* are deep, rounded and very interesting. Steve Jobs of course, is always strangely intriguing, but then there is Bill Atkinson, Andy Hertzfeld, Jef Raskin, Larry Tesler, John Scully and many others. Once the Macintosh project was under way at Apple, it was practically three years of obsessive dedication by the players. Did you know that the first concepts of what Macintosh was supposed to be, was a true "computer for the rest of us", meaning it was to cost less than \$1,000, be powerful yet easy to use and balanced with a "Swiss army knife" kind of utilitarian design. Steve Jobs originally hated the idea and then took it over. The Macintosh changed many lives, including mine (I'm now a publisher!) -DG

HCS Book Reviews

"How The Boys Of Silicon Valley Make Their Millions, Battle Foreign Competition, And Still Can't Get A Date"

You know, I almost could have gotten away with leaving this side of the page blank, because the sub-title practically says it all! Accidental Empires is another example of a well balanced book, concentrating on the people involved as much as the machines and their history. Robert Cringely is a down-to-earth writer who presents a little different perspective on the past of personal computing. He discusses the lesser known business side of the many computer hardware and software stars. All of the names in computing which you love/hate are here - Charles Simonyi, Bill Gates, Steve Jobs, Dan Bricklin, Don Estridge, Gary Kildall and many more. He covers the start-up of Fairchild Semi-Conductor, Intel, MITS, Digital Research, Microsoft, Apple, VisiCalc, IBM and others.

At the beginning of his book, Cringely states that he is ".. here to tell you three things:

1. It all happened more or less by accident.

2. The people who made it happen were amateurs.

Accidental Empires

by Robert X. Cringely

\$11.00 soft cover

HarperBusiness A Division of HarperCollins 10 East 53rd Street New York, NY 10022

3. And for the most part they still are."

I particularly enjoyed the second chapter entitled "The Tyranny of the Normal Distribution". This chapter discusses an article on the study of short-term memory written by a Harvard psychologist named George A. Miller in the 1950s. In the article, Dr. Miller had studied the average maximum amount of numbers or similar data which an individual(s) could quickly memorize. He found that result to be seven, give or take two. Now comes in the normal distribution, Dr. Miller's findings translated the 7 +/-2 into a percentage of the population or that 99.7% of all people could remember that amount of data. So, Cringely reminds us that "bell-shaped curves" (in statistics) are symmetrical, meaning that "as many people can remember more than nine numbers as can remember fewer than five." Restated, that is .15% or 3 out 2000 people can remember more than nine. He then shocks us by stating "there are approximately 375,000 such people living in the United States, and most of them would make terrific computer programmers, if only we could find them."

Robert Cringely makes you think. He has unique and interesting insights into the personalities of the programmers and engineers which brought us our computer hardware and software. *Accidental Empires* is truly an American story that is tragic, exciting, funny, surprising and often inspiring. -DG

Classic Computer Emulators A Library Proposal

By Tim Swenson

One problem with using older computers is that they have a tendency to develop hardware problems. One way to keep using our older computers, is to use "new" hardware or virtual hardware by emulating it with software. This also allows you to use more that one computer, on a computer.

A number of different shareware and freeware emulators have been written for various computers. Compiling a list of what emulators run on what platforms would be time consuming, considering the number of computers available to run emulators on. Below is a list of emulators from a single Anonymous FTP site that runs under MS-DOS. I've picked MS-DOS because of how many people have MS-DOS computers. Perhaps if each member of HCS selects their favorite computer and compiles a list of all emulators that it can run (freeware, shareware, or commercial) we could really come up with a comprehensive list.

This list is from the Anon-FTP Archive site oak.oakland.edu under the pub/msdos/emulate directory.

22nce140.zip 68em10.zip ame86.zip ap12em.zip c64.zip cpcemu08.zip jpp-b4.zip jpp.zip mcx11v15.zip model1-b.zip myz80111.zip pc370v42.zip sim6822c.zip spec145.zip ts1000.zip v2080j88.zip v20boot.zip xtndr093.zip z80-201.zip z80mu52b.zip zrun321.zip zsim22.zip

pcdgn102.zip

Z80 CP/M emulator for MS-DOS systems 6800 emulator for DOS, includes a realtime O/S CP/M-86 emulator for MS-DOS Apple][emulator for 286+, w/ASM source code Commodore 64 emulator, req Hercules video card Amstrad CPC emulator, requires 386, VGA Sinclair ZX Spectrum 48K emulator, reg 386+VGA Emulates a ZX Spectrum 48K RAM Z80-based micro MC68HC11 Microcontroller multitask executive TRS-80 Model I emulator & support progs Simeon Cran's Z80 CP/M Z-System emulator PC/370 v4.2 IBM 370 assembler and emulator Motorola 68HC11 uController simulator Emulates a Sinclair ZX Spectrum on any PC Timex/Sinclair 1000 w/printer emulator Run CP/M-80 programs on system with V20 cpu Turbo Pascal source code for V20 CP/M emulator Sinclair ZX81 (TS1000) emulator ZX Spectrum 48/128 emulator 'Z80' v2.01 CP/M (Z80 processor) emulator for MS-DOS Z80 CP/M emulator for MS-DOS Z80 emulator + CP/M-80 BIOS to run CP/M Dragon 32/Dragon 64/Tandy CoCo emulator & utils

Thanks Tim. I think Tim's idea is a terrific one and HCS is behind it all the way. I urge everyone to please investigate availability of emulators for their systems. We are dedicated to creating a library here at our office and making the shareware / freeware emulators available to anyone for the cost of disks and postage. Please gather together emulators and documentation and send it to our address. I will print the expanded list as it grows. Be charitable and support this project. For many people in the future, emulation may be the only way for them to readably watch old "computers" running their respected environments and software. I will keep you posted on our progress. -DG

Computer History Books

Additions and Editing by David Greelish

- 1. Accidental Empires, Robert X. Cridgely, 1992
- 2. Accidental Millionaire: The Rise and Fall of Steve Jobs at Apple Computer, Lee Butcher, 1988
- 3. Big Blue: IBM's Use and Abuse of Power, Richard Thomas Delamarter,
- 4. Bit by Bit: An Illustrated History of Computers, Stan Augarten, 1984
- 5. Blue Magic: The People, Power and Politics Behind the IBM Personal Computer, James Chposky, 1988
- 6. Breakthrough to the Computer Age, Harry Wulforst, 1982
- 7. Charged Bodies: The People, Power and Paradox in Silicon Valley, Thomas Mahon, 1985
- 8. A Collector's Guide to Personal Computers and Pocket Calculators, Dr. Thomas F. Haddock, 1993
- 9. The Computer Pioneers: The Making of the Modern Computer, David Ritchie, 1986
- 10. Consumer's Guide to Personal Computing and Microcomputers, Freiburger & Chew, 1978
- 11. Corporate Chrisis: NCR and the Computer Revolution, W. S.
- 12. Cuckoo's Egg, Clifford Stall, 1991
- 13. Cyberpunk: Outlaws and Hackers on the Computer Frontier, Katie Hafner & John Markoff, 1991
- 14. The Devouring Fungus, Karla Jennings, 1990
- 15. Digital Deli, Steve Ditlea, 1984
- 16. Digital at Work, Jamie Pearson, DEC
- 17. Digital Equipment Corp: The First 25 Years, Kenneth Olsen
- 18. The Dream Machine: Exploring the Computer Age, Palfreman & Swade, 1991
- 19. Early British Computers: The Story of Vintage Computers and the People Who Built Them, Simon Lavington, 1980
- 20. Electronic Computers: A Historical Survey, Saul Rosen, 1969
- 21. Engines of the Mind: A History of the Computer, Joel Shurkin, 1984
- 22. A Few Good Men From UNIVAC, Lindstrum?, MIT Press
- 23. Fire in the Valley, Freiburger & Swaine, 1984
- 24. From Dits to Bits: A Personal History of the Electronic Computer, Herman Lukoff, 1979
- 25. Fumbling the Future: How Xerox Invented Then Ignored the First Personal Computer, Smith & Alexander, 1988
- 26. Hackers: Heroes of the Computer Revolution, Steven Levy, 1984
- 27. Hard Drive: Bill Gates and the Making of the Microsoft Empire, James Wallace, 1992
- 28. The History of Computing, Marguerite Zientara, 1981
- 29. The History of Computing Technology, Michael Williams, 1985
- 30. A History of Personal Workstations, Adele Goldberg, 1988
- 31. Home Computers, Editors of Consumer's Guide, 1978
- 32. How to Buy and Use Minicomputers and Microcomputers, Williams
- 33. Hypergrowth: The Rise and Fall of Osborne Computer Corporation, Osborne & Dvorak, 1984
- 34. ICL: A Business and Technical History, Martin Campbell-Kelly, 1989
- 35. Lessons: An Autobiography, An Wang, 1986
- 36. The Levering Computer Entrepreneurs: Who's Making It Big and How in America's Upstart Industry, Katz and Moskowitz, 1984
- 37. The Little Kingdom: The Private Story of Apple, Micheal Moritz, 1984
- 38. The Macintosh Way, Guy Kawasaki, 1990
- 39. The Making of Microsoft: How Bill Gates and His Team Created the Worlds Most Successful Software Company, Daniel Ischbiah, 1991
- 40. The Media Lab: Inventing the Future at MIT, Stewert Brand, 1988
- 41. Microcomputers Buyer's Guide, Tony Webster, 1983
- 42. The Micro Millennium, Christopher Evens, 1980
- 43. Milestones in Software Evolution, Lewis Oman, 1990
- 44. The New Alchemists, Dirk Hanson, 1982

- 45. Odyssey: Pepsi to Apple, John Sculley with John A. Byrne, 1988
- 46. Once Upon a Time in Computerland: The Amazing Billion-Dollar Tale of Bill Millard, Jonathan Littman, 1987, 1990
- 47. The Origins of Digital Computers, Brain Randell, 1982
- 48. Out of the Inner Circle, Bill Landreth, 1985
- 49. Portraits in Silicon, Robert Slater, 1987
- 50. Portraits of Success: Impressions of Silicon Valley Pioneers, Carolyn Caddes, 1986
- 51. Programmer's at Work: Interviews, Susan Lammers, 1986
- 52. Project Whirlwind, Redman & Smith, 1980
- 53. Riding the Runaway Horse: The Rise and Decline of Wang Laboratories, Charles Kennedy, 1992
- 54. The SAGE Air Defense System, John Jacobs, 1986
- 55. Silicon Valley Fever: Growth of High Technology Culture, Rogers & Larsen, 1984
- 56. The Sinclair Story, Rodney Dale
- 57. The Soul of a New Machine, Tracy Kidder, 1981
- 58. Stan Veit's History of the Personal Computer, Stan Veit, 1993
- 59. Steve Jobs: The Journey is the Reward, Jeffrey S. Young, 1988
- 60. Sunburst: The Ascent of Sun Microsystems, Mark Hall & John Barry, 1990
- 61. Technobabble, John A. Barry, 1992
- 62. Tools for Thought: The People and Ideas Behind the Next Computer Revolution, Howard Rheingold, 1985
- 63. The Ultimate Entrepreneur: The Story of Ken Olsen and Digital Equipment Corp., Glenn Rifkin
- 64. West of Eden: The End of Innocence at Apple Computer, Frank Rose,
- 65. Woz: The Prodigal Son of Silicon Valley, Doug Garr, 1984
- 66. Zap: The Rise and Fall of Atari, Scott Cohen, 1984

Did we miss one?! Just drop us a line if you have one we didn't know about. Also please write if you're knowledgeable about the status of availability / non-availability of these books.

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COMPUTER MUSEUMS

DID YOU KNOW THAT THERE WAS <u>ONE</u>? Well, there's not! There are <u>two</u> computer museums!

By Tim Swenson & David Greelish

few months ago, Tim Swenson ("our man on the street") made the journey to Boston and was able to tour **The Computer Museum** there. Here is his review and observations of the visit. -DG

The Computer Museum is on the 1st, 5th and 6th floors of an old warehouse near the

wharf in Boston. The entrance is located on the first floor, while the main exhibits are on the 5th and 6th floors. There is a large elevator that takes visitors to the exhibit rooms. With its glass sides, it provides a good view of the south end of the Boston Harbor, with a direct view of the Boston Tea Party Museum and Ship.

The tour starts on the 6th floor with the Robot exhibit and the computer history exhibit. The robot exhibit covers the history of robots and has a number of historical robots on display in the Robot Theater. About half of the exhibit is comprised of a number of computers that visitors can use to see artificial intelligence and robotics at work.

The Robot Theater is a 10 minute show of about 20-25 historical robots (the real ones, not the ones in the films). A few of the robots move in the Theater. A narrator talks about the specifics of each robot and it's significance.

The computer history exhibit covers computing from the 30's to the 80's. For the 30's, it covers tabulating machines. For the 40's, it covers the first digital computers, for the 50's it covers the UNIVAC, for the 60's it covers the early IBM machines, for the 70' it covers the minicomputer, and for the 80's it covers the personal computer. The IBM PC and the

Macintosh have their own display, with about 8 historical computers in a shelf display. The last part of the exhibit, shows how computers are now in everyday items (CD players, portable telephones, microwaves, etc).

On the 5th floor is the Walk-through computer and the Tools and Toys exhibit. There is a large monitor (not real), a large keyboard,

and a large mouse at the entrance of the exhibit. Once inside, the bus of the computer is lighted with small blinking Christmas lights. The main part of the interior exhibit is the CPU, of course, with a big Intel logo on it.

The Tools and Toys exhibit, sort of shows the more fun side of the personal computer. This exhibit seems to be aimed mostly at kids.

The Computer Museum Store, also on the first floor, was fun to browse. Besides the usual science related toys, video's and general books, there was a good selection of computer history books. I was surprised to see a selection of old mainframe documentation / books for sale. There was even some assorted small boards



PEOPLE AND COMPUTERS EXHIBIT LOGO

and parts from old mainframes for sale. It was very different to see a museum selling historic pieces.

I expected the Museum to be bigger and cover more in the history of computers. The number of PC's on display was disappointing. The Dayton Microcomputer Association has a better display of PC's in it's computer museum. I don't know how many total microcomputers the museum has that are not on display.

The key thing is the audience that the Computer Museum is aimed at, the general public and not those that have a key interest in

Computing has

all of our lives

important role in

for a minimum of

thirty years now.

like, even without

What would life

in America be

the computers

you don't see

everyday? You

remember the

but will your

grandchildren?

children or

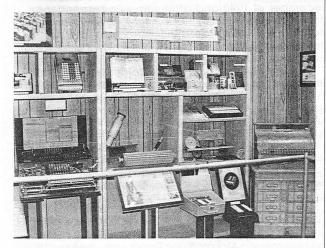
might be able to

"good old days".

played an

computer history. The computer history exhibit reminds me of the Information Age exhibit at the Smithsonian Institution in Washington, DC. The type of coverage and depth of coverage is about the same. #B

Now, lets take a look at the American Computer Museum in Bozeman, Montana. -DG



"There's is an 'other' computer museum?", you may be asking, and the answer is "yes". The American Computer Museum is only the second official computer museum in the world. Located in Bozeman, Montana, not too far from Yellowstone National Park, the American Computer Museum was started and is operated by George and Barbara Keremedjiev. They began the museum in May, 1990 out of concern that Americans would too soon forget the roots of computing in this nation.

Their collection was started one day by George when he ran across a 1914 German adding machine and bought it. "I started scouring antique stores and flea markets. I was interested in both mechanical and early electronic calculators, and they were almost always hidden away." From there, his interests spread to embrace all computing devices and computers. The American Computer Museum is the Keremedjiev's hobby, gone out-of-control, but thankfully, for our benefit!

The museum is currently housed in a 2,000 square foot building in downtown Bozeman, and exhibits a little more than 700 items. This only represents about 15% of the total collection. The other 85% is currently in storage awaiting the day when George and Barbara can realize their goal to acquire a 50,000 square foot building in Bozeman to establish the "full" museum.

The museum is structured around a timeline depicting the evolution of mathematics, computing and robotics over a 4,000 year period. "From Babylon to the Microchip" is one of several exhibits with hundreds of descriptions and historical devices from ancient Babylonian, Egyptian, Greek, Roman and Hindu-Arabic times through the rise of the modern computer. The evolution of electronics includes exhibits on Thomas Edison, the transistor, micro-chips and a working industrial robot. Educational tours allow students and their teachers to marvel at the calculating dinosaurs of the past including room-sized IBM mainframes, hand-held calculators, slide-rules,

minicomputers and the microcomputer. There is the prototype of the first hand-held calculator & related materials signed by the inventors, autographed photographic exhibits covering some of the major computer pioneers of the 20th century.

The American Computer Museum is currently working on a new exhibit centered around the impact of electronics and computers in space travel. There will be many artifacts from NASA, the Smithsonian and the Apollo moon missions. It is a celebration of the 25th Anniversary of the first walk on the moon. The exhibit will be ready for viewing by this summer.

Visitors with technical and scientific backgrounds as well as those with little or no such training will both find the museum interesting and educational. The museum is located at 234 East Babcock Street, Bozeman, MT 59715. #B

I have not personally visited the museum, but hope to this summer. Segments of this article are taken directly from the American Computer Museum's promotional information. Take a vacation and visit the ACM, it will be a trip well spent. -DG



- Apple II continued -

typed were in lower-case, unless the SHIFT key (attached now to paddle button PB2) was also being pressed; in that case the letter would be entered as upper-case. Since the PB2 button was not often used for a second pair of game paddles, it was unlikely that this modification would be accidentally triggered by pressing one of the game paddle buttons. HB

Well, what came next? The Apple IIe of course, but that's a later story. This concludes our three part feature on the earlier days at Apple Computer and the beginnings of the Apple II. -DG

About the author - Steve Weyhrich is a family physician from Omaha, Nebraska. He has been using Apple II computers since 1981, and writing about them since 1990. He follows closely the events that continue to shape the destiny of the legendary Apple II and IIGS computers, and writes the monthly columns "A2 News Digest" for A2-Central disk magazine, and "Polishing Green Apples" for GEnie Lamp A2. His "Apple II History" in its full and unabridged form is available on the A2 Roundtable on GEnie, and on fine Apple II BBS's everywhere.

- Part III Bibliography -

Steven Levy, HACKERS: HEROES OF THE COMPUTER REVOLUTION

H. Edward Roberts and William Yates, "Altair 8800 Minicomputer, Part 1", POPULAR ELECTRONICS, January 1975, p. 33, 38. (The article is interesting also in some of the terminology that is used. The Altair is described as having "256 eight-bit words" of RAM. Apparently, the term "byte" was not in common use yet.)

Gene Smarte and Andrew Reinhardt, "15 Years of Bits, Bytes, and Other Great Moments", BYTE, September 1990, p. 370-371.



- Atanasoff continued -

war years, ineffective patent application people, and his varying subsequent jobs, those applications were never made. (Much to lowa State's regret in retrospect, I'm sure!)

In the meantime, Atanasoff discussed with John Mauchly the system he and his assistant were building at lowa State. He had first met Mauchly at a conference in December of 1940 and after some correspondence, Mauchly spent six days in Ames in June of '41. While there. Mauchly was given detailed access to one of the prototypes and took notes on the 35-page manuscript. The rest is history, as they say.

After the war, Mauchly continued computer development, leaving the University of Pennsylvania to form his own company, UNIVAC. That venture only became successful after he was bought out by Sperry Rand in 1950. But because of his wartime work, Atanasoff became an ordinance scientist for the Army and Navy, then, in 1952, a private consultant. Once during the fifties, he was approached by IBM about breaking the stranglehold Mauchly and Eckert's ENIAC and EDVAC patents held on the budding mainframe industry. Then Big Blue licenced rights! A suit was even attempted by Ma Bell in 1962.

The real challenge emerged, however, with publication of a book titled ELECTRONIC DIGITAL SYSTEMS by R.K. Richards in 1966. He questioned ENIAC's primacy and documented Atanasoff and Berry's work and Mauchly's visit. This sparked an investigation and law suit brought by Honeywell against Sperry Rand Univac. To give you a feel for the timeframe over which this suit progressed, the investigation and taking of depositions began in 1967. The actual non-jury trial began in Minneapolis in the summer of 1971. The final brief by Honeywell was filed in late summer the following year, charging Sperry Rand and Mauchly with patent fraud. And the judge's formal opinion was issued in October, 1973. It overturned the ENIAC patents by stating that the electronic digital computer was, in fact, invented by Atanasoff and that Mauchly and Eckert's work was derivative. The fact that U.S. law requires that prior work be explicitly credited in patents and the ENIAC and EDVAC patents did not even mention Atanasoff and Berry's device was certainly a factor in the decision.

Finally, if you wish to explore the details in this history beyond the survey in Mackintosh's *SCIENTIFIC AMERICAN* article and my comments above, check out Clark Mollenhoff's *ATANASOFF: FORGOTTEN FATHER OF THE COMPUTER* (lowa State University Press, 1988). Mollenhoff, a former reporter for the Des Moines *REGISTER* newspaper, covers the events in excruciating detail. My only criticisms of this book are that his reportorial style often becomes repetitious and he gives little coverage to the hardware. But the story is engaging, nonetheless, and little-known. #B

new TRS-80 Model III microcomputer

FRIENDS OF HCS

A Listing of Associate Publications and Groups - Unique and Helpful Resources

The Analytical Engine, A 48+ page quarterly newsletter of our fellowship group, the Computer History Association of California. Published by CHAC, Kip Crosby, Executive Director, CHAC (Internet: cpu@chac.win.net) 1001 Elm Court, El Cerrito, CA 94530-2602, Fax# (510) 528-5138. CHAC is an organization somewhat similar to HCS, though somewhat different. Many of the members talk on the Internet in the alt.folklore.computers newsgroup. CHAC is concerned primarily with computers which originated in California or played a substantial role there during their life cycle. The Engine (issue #4 now out) contains a wealth of stories, letters (mostly Internet e-mail) and lots of interesting information, insights and questions and answers. It is most like HB because of all the history it contains. A noticeable difference though, is that the stories and such seem to lean more towards mini-computers, mainframes and "old iron". CHAC is planning a museum as soon as possible and they have a fast growing and well balanced collection of computers. Membership is \$35 a year.

The Computer Journal, A 48+ page bimonthly journal/newsletter which is the foremost text on today's CP/M (and now also PC/XT) user. Published by Bill D. Kibler, The Computer Journal, P.O. Box 535, Lincoln, CA 95648-0535. (916) 645-1670. TCJ (issue #66 now out) contains lots of projects and is geared more to the technically oriented hobbyist. Regular features are: "Editor's Comments", "Reader to Reader", "Small System Support", "Dr. S-100" and also support group listings and more. \$24 a year.

The Z-Letter, A 20+ page bimonthly newsletter supporting Z-System and CP/M users. Published by David A.J. McGlone, Lambda Software Publishing, 149 West Hilliard Lane, Eugene, OR 97404-3057, (503) 688-3563. The Z-Letter (issue #30 now out) is an excellent resource for serious CP/Mers. It usually has a mixture of history and technical information on a variety of systems, though mostly concentrating on late 1970's and early 1980's CP/M machines. David does an excellent, professional job with features like: "Random Access" (editorial and news), "Personal Ads", "Letters", listings of support businesses, people and other publications, plus more. \$18/12 issues.

The STAUNCH 8/89'er, A 24 page newsletter dedicated to the H-8/89 user. Not in publication at this time, but Kirk L. Thompson, Editor, P.O. Box 548, West Branch, IA 52358, (319) 643-7136, has numerous copies of 30+ back issues which he can supply. If you own a HeathKit computer, The STAUNCH is a must and Kirk can also help you with HDOS and public domain software. \$3 an issue.

the world of 68' micros, A 30+ page newsletter printed 8 times a year which supports mostly CoCo's and other 68xx & 68x0x platforms. A newer journal (issue #6 now out) published by F. G. Swygert, FARNA Systems, P.O. Box 321, Warner Robins, GA 31099-0321 (Internet: dsrt@Delphi.com). Another fine and professionally published magazine which is helping me to learn much more about 6809 processors and OS-9. An invaluable technical resource for the 68' micro user. \$23 a year.

The International Calculator Collector, An 8+ page quarterly newsletter of the International Association of Calculator Collectors. Published by Guy Ball & Bruce Flamm, Co-Editors, Wilson/Barnett Publishing, IACC, 14561 Livingston Street, Tustin, CA 92680. A fast growing organization and a nice little newsletter (vol. 2, issue 1 now out) with some very interesting information about calculator history, classifieds and discussion. \$8 a year.

QL Hacker's Journal, A mini 12+ page newsletter dedicated to Sinclair programming and hacking. Published by Tim Swenson, 5615 Botkins Road, Huber Heights, OH 45424. Write him for more info.

Elliam Associates, P.O. Box 2664, Atascadero, CA 93423, (805) 466-8440. Sells public domain and commercial CP/M software for most CP/M based platforms. They also specialize in the Amstrad PCW. Elliam has tons of CP/M software offered in two packed catalogs. See business card ad.

FARNA Systems, Box 321, Warner Robins, GA 31099-0321, (912) 328-7859. Offering CoCo and OS-9 software, publications and support. See business card ad.

Lambda Software Publishing, 149 West Hilliard Lane, Eugene, OR 97404-3057, (503) 688-3563. A licensed dealer of CP/M 2.2 and manuals, plus a large collection of CP/M boot disks for many machines. CP/M related software manuals, fonts, word processing and spread sheets. Dealer of Z-System and *Micro Cornucopia* reprints. Disk copying.

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- Historically Brewed Ad Cards -

"Business Card" ads are available in *HB* for only \$15 per issue (for subscribers).

Please summit ads for issue #6 before June 10, 1994.

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REMEMBER... Please mention that you saw the ad in HISTORICALLY BREWED!

Apple Pie a final tribute by Steven Weyhrich (profuse apologies to Don McLean)

A long, long time ago, I can still remember how those programs Used to make me smile. And I knew if I had my chance, That I could make those usens dance And maybe they'd be happy for a while. November breezes made me shiver With every upload I'd deliver Bad news on the desktop I couldn't make the text stop. I can't nememben if I cuied When I nead about our faltered pride But something touched me deep inside The day the lle ðíeð.

So, bye, bye to my Apple II pie
Hooked my RamFAST to the SCSI
But the SCSI was fxied
And hackin' boys drank Mountain Dew and sighed,
Typin' "This'll be the day that I die."

Do you know your Apple's core?
Do you have faith in Woz's lone
If the Red Book tells you so?
Do you believe in ROR and ROL
Can BASIC save your mortal soul.
And can you tell me why Pascal runs so slow?
Well, I know you love that Lisa hack
'Cause I saw you mousin' in the back
Well, MacWrite was big news
But AppleWorks got great reviews, ooch
I was a twenty-something computer fan
With a loaned assembler and some program plans
But I knew I'd be just an "also-ran"
The day the lie died.

I stanted singin'
Bye, bye to my Apple II pie
Hooked my RamFAST to the SCSI
But the SCSI was tried
And hackin' boys drank Cola Jolt and sighed,
Typin' "This'll be the day that I die.
This'll be the day that I die."

Now for twelve years we've been on our own The software comes on my telephone But that's not how it used to be When ol' Steve Jobs planned a brand new box With designs he borrowed from Xerox And the cash, well it came from you and me Oh, and while our Woz was looking down Steve Jobs stole his designer's crown The // plan was adjourned No money was returned And while Wagner wrote "Assembly Lines" We liked our BASIC programs fine And most thought ProDOS was devine The day the lie died.

We were singin'
Bye, bye to my Apple II pie
Hooked my RamFAST to the SCSI
But the SCSI was fried
And hackin' boys drank Dr. Pepper and sighed,
Typin' "This'll be the day that I die.
This'll be the day that I die."

HUFFIN, PUFFIN, move files with MUFFIN Single duive, lots of disks I'm stuffin' Eight piles high, and tadin' tast...
With Macs out landing in the grass
The Pirates tried for a forward pass
Moving lle to the sidelines, in a cast
Now, the llc Fair was sweet perfume
And 'Forever!' was our marching tune
We all got up to dance
Oh, but we never got the chance
'Cause the Mac-heads tried to take the field
Our Apple ll's refused to yield
Do you recall what was revealed
The day the lle died!

We started singin'
Bye, bye to my Apple II pie
Hooked my RamFAST to the SCSI
But the SCSI was tried
And hackin' boys drank Diet Pepsi and sighed,
Typin' "This'll be the day that I die.
This'll be the day that I die."

And there we were all in one place
An online conference lost in space
With no bucks left to start again
So come on. Tom be nimble, Tom be quick
Uncle-DOS made all our Apples tick
'Cause Merlin is the hacker's only friend
Oh, and as I watched him on the stage
My hands were clenched in fists of rage
No one that I could tell
Could break that Sculley's spell
And as the flames climbed high into the night
To light the sacrificial rite
I saw Sculley laughing with delight
The day the lie died

He was singin'
Bye, bye to my Apple II pie
Hookeo my RamFAST to the SCSI
But the SCSI was tried
And hackin' boys drank lemon tea and sighed,
Typin' "This'll be the day that I die.
This'll be the day that I die."

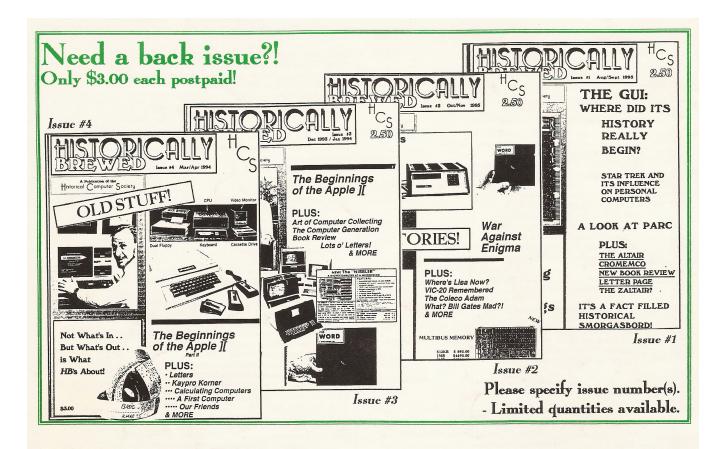
I met a ginl who sang of Blues
And I asked her for some Apple news
But she just smiled and turned away
I went to the computer store
Where I'd seen the Apple years before
But the man there said the lle couldn't play
And in the schools the children screamed
The teachers cried and the backers dreamed
But not a word was spoken
The disk drives all were broken
And the news mags that I'd liked the most
Softalk inCider -- were all toast
They'd grabbed the last train for the coast
The day
the lle
died

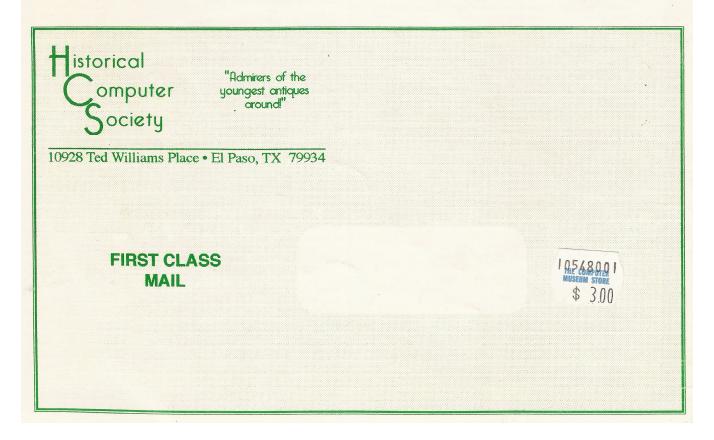
And they were singin'

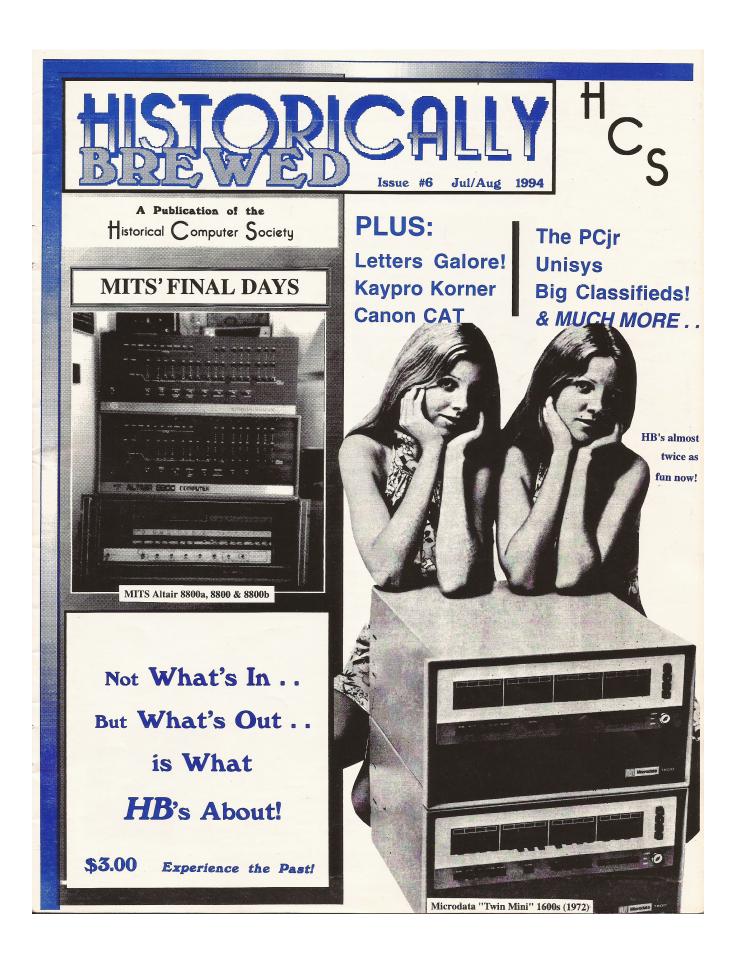
Bye, bye to my Apple II pie Hooked my RamFAST to the SCSI But the SCSI was fried And hackin' boys drank Snapple soda and cried, Saying, "This'II be the day that I die."

They were singin'
Bye, bye to my Apple II pie
Hooked my RamfAST to the SCSI
But the SCSI was tried
And hackin' boys drank Snapple soda and cried,
Saying, "This'll be the day that I die.
This'll be
the day

that I die."







FROM THE PUBLISHER

Computer history nostalgia . . Is it taken seriously yet? Is it ready for the mainstream?

By David A. Greelish, Publisher & Editor



Some guy who snuck into my office . . and my suit!!

"You collect what?! You have how many?! Why would you want to?! Don't they take up a lot of space? My friend's brother has an old 286 he wants to sell! I think he only wants about \$500 dollars for it!"

ave you worked up the nerve lately to tell someone about your interest in computer history? Do you usually dare to mention that you "kinda" have a small collection of old computers? What kind of reactions do you get? I've almost sworn off the activity! Most people just don't seem to get it. They see no reason why anyone would be interested in outdated electronics. It used to bother me, but not so much now that I know about 150 other people who share in my hobby! What does still bother me a little though is; we've been mentioned in the press some lately and I am constantly getting calls and letters from people who want to know if their old Apple)(or IBM word processor or whatever is worth anything! All I can keep saying is, "Well, to a collector like myself, it does have value, it is almost priceless, but in the "real" market . . maybe . . \$50?

How long will it really take before older machines

are true collectors items? Who knows, but there are a lot of reasons to collect things and that isn't why I collect computers. It isn't about making a smart investment, it's about celebrating creative vision and design (good or bad).

There is an article about me and HCS in the current Texas Monthly magazine. It is written by a graduate student from U of T named Michael-Jean Erard. He visited with me from Austin for a full and made many interesting observations in his article (perhaps he should have been a

psychologist?!) I like his story very much. See if you can find a copy in your state.

I think Michael captured on paper perfectly the reasons why I enjoy computer history and why I started collecting old machines. I think it is true for a lot of us - "When he talks about his 25 microcomputerswhat are now generally called personal computers-he stumbles occasionally over their technical intricacies. But he grows eloquent when he speaks about the people who developed them. Greelish's stories are rich with the details of who built the machines, why these pieces of equipment were unique, why they succeeded or failed. Computer technology changed so quickly and radically in the seventies and eighties, he thinks, that we did not have time to explore its possibilities. There are lessons to be learned from the machines themselves and the stories about them, and neither should be discarded or forgotten." "Listening to him, one comes to understand that computers have filled some void in his life, perhaps much the same as they did for the men he admires so

much."

What can I say? I think he's right, HCS has filled some part of me that was empty before. I have found my niche! Lets hear from you now; why do like computer history? Why do you collect old hardware? Please write me a letter or just jot down a few lines when you fill out your questionaire to be sent in. Yes, on page 20 you'll find a questionaire. When I first started HCS, I used to send out one with an information letter before our first newsletter came out. PLEASE answer the questions and send them in ASAP! For issue #7 (our 1st anniversary issue!) I will print a membership roster with lots of about information our membership. This will better promote correspondence between members. I will also print some interesting graphs about our membership demographics. The HCS database can become an important resource

Please enjoy issue #6 of HB! It's a little bigger and I hope a little better. Do you like all of the pictures? We have a scanner now! I would like to start a picture page with next issue. Please send in some pictures of yourself with your computers (use plenty of light). Best-DG HB

JOST DO TID

Machine Dreams



From Texas Monthly, July 1994

Historically Brewed is a bimonthly publication of the

Historical Computer Society

"Admirers of the youngest antiques around!"

To subscribe and join, please send a check or money order for \$18.00 to:

HCS 10928 Ted Williams PL El Paso, TX 79934

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Part of our display, L.A. Computer Fair, Mar '94

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Prove it by showing off your copy
of Historically Brewed!
If you know someone interested
in computer history,
tell them about HB.

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Erroll Foldes David T. Craig Michael J. Posner Mark Greenia

- What's In your HB -

From the Publisher	
HB Letters	2
MITS' Final Days	7
Kaypro Korner	9
Canon's CAT	11
Baby Blue	_14
Merger Madness (UNISYS)	_15
Trading Post	_ 16
Business Card Ads	_19

HB LETTERS

BE A PART, WRITE IN NOW!

Members share their stories, collections and comments. Isn't it time you wrote in with your computing lore?!

Dear Sir,

I saw a post that you put up in the Internet about a computer company selling Altair stuff known as MSRC. After calling him and begging for an Altair 8800 that he was sold out of, we got to talking and he told me more about you and the Historical Computer Society. He sent me a flyer about it and I would be proud and pleased to join. Being only 21, I missed most of the really exciting parts having to do with the birth of computers, my first being a TI-99/4a. I fell in love with computers, like I'm sure most in your group did, and became fascinated with "the old days" and terribly depressed that I missed them! Since, I have been trying to collect every old computer that I can come across. Most of them I actually use for something still, they are antiques, but they are great fun to work with and still have a definite purpose. I have been bending over backwards trying to get my hands on an Altair 8800 or an IMSAI 8080, but miss by anywhere from a day to five minutes on the sale of one (extremely painful and aggravating). Here is what I have so far:

IO928 Ted Williams Place El Paso, TX 79934

Send your

suggestions and

history.

ideas to:

HCSLetters

or e-mail us at: historical@aol.com

- Commodore Amiga (as my new machine of course)
- Commodore 128 (nice because it has a Z-80, C-64 & C-128 inside and runs CP/M)
- Ridge-32 (first commercial RISC minicomputer)
- DEC Rainbow (3)
- Cromemco Single Card Computer
- DEC PDP-11/23 with rx-28" floppies
- DEC PDP-11/03 with drives, random cards and interfaces (2)
- DEC PDP-11/40 with core memory and 2 19" racks for systems
- TI-99/4a with expansion box, speech, etc.
- Tandy CoCo II
- IBM 8088 machine
- A minicomputer monster noise shielded line printer in cabinet
- Decwriter 2 terminal/teletype
- Commodore/MOS KIM-1 6502 single board (2)
 Plus a few other things I can't think of. I

just missed an Osborne last week and I think I have a good chance at a PET. I am interested in anything from '75 until the early '80s. Also, even early minicomputers. My PDP-11/40 used to be the "mainframe" that ran the University of New Hampshire! My 11/23 ran part of the Space Science Division at Cornell. No, I'm not bragging, I'm proud (grin). Thanks, and hope to hear from you soon.

Senter Reinhardt Troy, NY

Senter,

Glad you're a part of HCS! As I told you by e-mail, I believe you may be one of our youngest enthusiasts (and I thought I was special at 30!) I am also a bit disappointed for not being a part of the "revolution" originally, but we are all certainly a part of it now. And, continue to be proud at being part of a hobby that is wholly new and unique!

When I first started collecting computers last year, I came across a few Altairs, but now they already seem to be quite rare. I did purchase an Altair 8800b "turn-key" here locally, but sold it to one of our members in Sunnybank, Australia. He had named his business after the Altair and the 8800b is now proudly on display in his new store location! Hi Brian, thanks for the picture and article! -DG



Brian Maddern, his store and an article printed about him & HCS in Australia.

Dear HB,

I was once a member of the Homebrew Computer Club! It was a local dis-organization in the Palo Alto / Menlo Park area of California, just north of San Jose. Here are some memories: Many "members" were employees of HP and other high tech companies on the S.F. peninsula. The meetings were, for some time, held at the Stanford Linear Accelerator Center in the hills west of Menlo Park. The meetings took place in one of the auditoriums and "vendors" would set up a few folding tables in the lobby to promote their stuff. One particular night, a couple of guys who were irregular attendee's showed up with a new version of their bit of computer hardware. These guys had been doing pretty well selling a single board computer with almost NO WAY to communicate with the outside world, but they were STILL trying to make some money. Well, I had a nice IMSAI which worked and even had 2048 bytes of static RAM, real switches on a front panel, and LIGHTS (little red LEDs), so if you were smart enough to input some machine instructions, the lights might just do more than stare back at you when you hit the RUN switch. ANYWAY, I was WAAAY better than these two guys, so I paid them little attention.

Well, after the usual chaos of the meeting presided over by Lee Felsenstein, there was a time for others to have a say and present anything interesting to the group. This time preceded the end of the meeting which was called Random Access when we all clumped up to talk about whatever problems, discoveries, etc. we had come across since the last meeting. Well, these two fellows held up this plastic keyboard enclosure, announced a NEW product of their small company and advised us to break it. It seemed that this thing was a prototype and the only one they had. This one was a real breakthrough too, since the last thing they produced didn't even have a keyboard. Suddenly, one of the two Steves announced what they were going to call this new plastic computer. When I heard it, all I could think to say was . . Hummph! I guess I had been wrong.

Sincerely,

Bill Morrow Fort Lauderdale, FL

Man . . you said "hummph" about the IBM PC?! <pause> OK, I'm not fooling anyone. Everyone knew that Bill was really talking about the Apple) (right?! I should hope everyone knew that after reading our three part Apple history in issues 3, 4 & 5. Thanks Bill for writing in with your story. We also have a few other members who where members of Homebrew. In the future, I'll try and get some stories from them too -DG

Dear David Greelish,

Would you please send me a subscription to your newsletter. I would also like to buy all of the back issues. I have three classic computers:

- Timex/Sinclair 2068
- T/S 1000
- Atari 130XE

There is something to be said about all the older computers. They were some of the best machines in their time. I hope to see some articles about my older computers in your newsletter.

Yours Truly,

Dane Stegman Akron, NY

Dear Dane Stegman,

(Just giving you a hard time.) I am currently working on a piece about the history of Sinclair, concentrating mostly on the computers, but also on the man himself and the company. We have a T/S 1000 and will soon have the original Sinclair ZX-80. Now that HCS has a scanner, we will be featuring short stories on all of our collection with pictures! We still don't have an Atari yet, but fear not, there is so much history to tell! -DG

Dear David,

I like your publication! Here are the computers I have:

- Altair 8800
- · Altair 8800b
- Sol-20
- OSI Challenger
- Altos
- Apple)(s (several)
- TRS-80 model I, II, etc., etc.
- I found these in only two months here in Beaumont and in Houston.

Sincerely,

Walter Sutton Beaumont, TX Dear David,

I've just learned of your organization on Compute's Gazette Disk for Commodore 64 and 128 computers. I originally purchased a Commodore 128 (my first computer) in late 1987. In recent years I've been frequenting garage sales and thrift shops seeking rock n' roll records from the '50s to the present. In doing so I've been running across various home computers at dirt cheap prices. Currently I have:

- Commodore 128 (2)
- C-64VIC-20 (2)
- TI99/4a
- T/S 1000 (2)

All of these machines bring enjoyment in their own ways and I'm always seeking new information and programs to further my enjoyment of

them.

I'd like to join your organization and receive your newsletter Historically Brewed. I am seeking the following for my various machines: I have a T/S 2040 printer, but it lacks the necessary 24 volt power supply. Where can I obtain the power supply or a useful substitute? I also seek programs, books, magazines that might exist and other information on this cute little machine. TI99/4a books, magazines, programs of all kinds. Commodore VIC-20 books and programs. I've got a fairly large library of books and magazines, but seek to obtain more. I have magazines to trade for those that I need. Many thanks for any help you can provide.

Happy Computing,

Doug Wagoner Post Falls, ID

David.

I found your name on a Gazette Disk and I would like to know the price of your newsletter. I am a die hard Commodore 64 user. I have been working with a Commodore computer since 1984. Those of us who love the 64 need all the help we can get.

Sincerely,

Arlene Queen Nutter Fort, WV

Doug & Arlene,

Thanks for writing! I've also received about a dozen letters from other avid Commodore 64 users who saw the mention of HCS on that

Gazette disk. I am a big fan of the 64 myself. We have a couple of them here along with one of my favorites, the SX-64. With it I have a 1702 monitor, mouse and "Turbo" cartridge plus Geos and Geos Publisher. We should have a Commodore story soon! HB's "Ad Cards" section is the right place to look for support of all kinds of 8 bits. If you would like to subscribe to a great little newsletter dedicated to the Commodore, send \$15 to the "Classic 64 Preservation Society", 12913 Baker Road, Red Bluff, CA 96080. -DG

Hi David,

In the title box on page 1 of the May/June 1994 issue of Historically Brewed, you ran a picture (without caption, shame on you!) that caught my attention. The picture shows 5 minicomputers (actually 4, one is a dual processor) from around 1974, with a woman in the foreground and two men in hard hats opening the smallest of the minicomputers in the middle.

I used to work with that brand of mini! The computers in the photo all appear to be MODCOMP products (Modular Computer Corporation of Fort Lauderdale, Florida). The machine in the foreground looks like a MODCOMP II, a 16 bit minicomputer, while the dual processor in the background is almost certainly a dual MODCOMP IV, a 32 bit supermini.

I used a MODCOMP IV for 6 years, 1974 to 1980, and I recall the hardware fondly. The architecture was very clean, nicely pipelined, not a RISC, but not too complex, and very fun to write compilers for. The machine was on the market well before the VAX, and at first, it was hard to see why anyone would want a VAX. Architecturally, the machines had 16 registers of 16 bits each, with an 8 bit opcode and a 16 bit direct address. Are any of these machines preserved anywhere? My only souvenir is a programmer's pocket reference card.

Also, while looking at the picture from the American Computer Museum story on page 13, I noticed a very familiar calculator up on a shelf. The machine is a Millionaire, patent date 1895, close to 100 pounds, about a yard long, half a foot thick, and a bit over a foot wide, with the instructions pasted onto the inside of the lid. The statistics department at the University of lowa has one that they saved from their old computing laboratory, and it's a beautiful machine. I've learned how

to work it; it's basically a fully mechanical 4-function calculator except that it can't quite divide -- you have to guess the digits of the quotient, it does the bookkeeping for you.

I borrowed the machine once to haul it to a local elementary school. and it was a big hit with the 5th and 6th graders. Unlike a modern calculator, they could really "feel" it work. Turning the crank is a bit harder when there are carries to propagate, and if you look through openings in the case, you can see all the gears inside turning as they compute your results for you. When the calculator does multiplies, you can watch the product grow as each partial product is added in, one per turn of the crank. The kids ended up taking turns, doing the arithmetic with pencil and paper, and then checking their work on the Millionaire, and the teacher had to just about pull them away when it was time for me to pack up the machine and haul it back to campus.

Doug Jones
University of Iowa

Doug,

Well, you taught me a lesson - I'll always put a caption under every picture from now on! I'm not sure where I got the picture with the MODCOMP's, it's kind of a "stock" photo. I'm not sure if there are any of them being preserved anywhere either, let's hope so. I can't wait to start taking our collection "on the road" to schools. Hopefully, I will begin turing my home town with our collection this Fall after my family and I and HCS have moved to Jacksonville, FL. (around September 20th everyone). -DG

Hello David,

I am a member of DECUS in Australia, and a significant member of the 'Nostalgic and Obsolete Products' SIG which was formed many years ago to give moral support to users of vintage products. This was after Digital in Australia dropped support for the PDP-11 range (about 1982), not to mention the DECsystem 10/20 range. Our 'traditional leader' and DEC REP on the SIG is Mr. Max Burnet, who is well known as Museum Max both inside DEC and in the general computing community in Australia. He has acquired a good stack of vintage Diaital systems from Australian sites. Eg., PDP-4, part of PDP-6, PDP-7, early PDP-

8, PDP-11/20 (now working again), etc.
His main problem is lack of
enthusiastic support from DEC, and
limited space. He does have a PDP-7
on static display in the foyer at DEC
headquarters in Sydney and a workable PDP-8 next to the Cafeteria
though.

We figured that if Sydney can afford to host the Olympic games in the year 2000, then Sydney should have a working Computer Museum before then. We expect it to take 4 or 5 years to progress from our small group to a full time Museum. We all probably have different views as to what it should look like and what should be included. My feeling is that we should start with Mini-Computers, simply because of their ordinary power and cooling needs. I would like to see a system whereby we lend out systems to our commercial sponsors for six months at a time, and then swap them around. We do not have any meeting rooms or workshop facilities yet.

We have come to the realisation that 1993 was a turning point in computer history - every vendor now packs even their most powerful systems into desktop or deskside boxes. Big cabinets are on the way out rapidly. We have to collect and store whatever we can now. Things like micros I don't see any problem with. There are lots of individuals out there with all sorts of things hidden away in the garage or on top of a cupboard. Being relatively small they will be safe for a long time. Anything that takes up space or power or air-conditioning is at real risk in the big cities.

I hope this gives you some idea of what we are up to in Oz.

Regards,

John Geremin Sydney, Australia geremin@decus.com.au

Hi David!

Greetings from President to President!

My name is Seth Morabito, and I'm the president of the Cornell University Classic Computer Club. For a while I've wondered about tracking down all the other historical and classic computer buffs on and off the net, and seeing what we could come up with. It looks like you've got a good head start with your newsletter. I'm

also interested in trying to 'link up' some of the bigger computer clubs at the Universities (like HACKS at the University of Arizona and UPDATE at the University of Uppsala in Sweden) and non-university computer clubs, so we can all exchange notes.

Here's a little background on our group if you're interested: At the moment, The CUCCC doesn't officially exist, at least we don't have official University status, but that will change next semester, at which point we'll (hopefully) get a room for our growing collection, an official meeting schedule, and lots more accomplished. Our collection right now includes a MicroPDP-11/23+, a PDP-11/34a (hopefully 2 in the near future), a couple of IMSAI 8080's & tons of S-100 cards, a DEC Rainbow 100, a TI-99/4, a Sinclair ZX-81 (home built), an assortment of DEC VT-100, 102, and 220 terminals, a near complete collection of BYTE, Dr. Dobbs Journal, Creative Computing, Kilobaud, and People's Computing.

Well, I'm quite excited about the possibility of linking our groups somehow, even if it's just exchanging official news with each other and staving in contact. There's a big world of classic computer enthusiasts out there waiting to be reached. It's my sincerest hope that we can do it BEFORE people begin *shudder* to collect old computers for monetary value. I have no doubt that day is coming FAST, and I want to get my hands on some good systems before they become impossible to buy outside of an auction house. After all, we're interested in preserving them for the sake of learning about them, NOT for selling them to the highest bidder like some side of beef. *ahem* Soapbox mode of!

Take care, and I hope to hear from you soon!

Seth J. Morabito
President, Cornell University Classic
Computer Club

Hello,

I understand you are publishing a computer history magazine. I was not a primary, but I was a bystander during some interesting times:

I remember when there were only 25 nodes on the ARPAnet, the ancient prede-cessor to The Internet.

I remember a grad student (Ed

Catmull maybe?), burst from The Quiet Room at the University of Utah. He had been attempting to model the wave forms of a human vocal tract with the intent of eliminating surface noise from an old Caruso phonograph record. The accidental result, which he kept shouting, was, "I've erased the orchestra! I've erased the orchestra! Signal Processors are big business today, but that was the first time this kind of thing was achieved.

"Wumpus" a Basic program predated "Adventure" a PDP-11 Fortran program, which in turn, inspired "Dungeon" written in MDL. David Liebling, Marc Blanc, and a third perpetrator, Tim (don't remember the last name), sent out new versions of "Dungeon" once or twice a month to every PDP-10/Tenex site on the entire ARPAnet. Dungeon was eventually commercialized, split, and renamed Zork1 & Zork2 after its 'Great Underground Empire'.

I was there when Ivan Sutherland was experimenting with his mechanically-tracked "Head Mounted Display" in "The Sword Room". I did some of the mindless assembly of the matrix multiplier for the head mounted display that allowed real-time display of a wire-frame image of a cube. The matrix multiplier had few if any ICs. I only remember discrete components and that the resulting device took 5 or 6 full-height open 19" equipment racks. Again, matrix-multiplier ICs are a commodity item today, but at the time, it was unique.

The Association of Computing Machinery (ACM) put out a book called *A Quarter Century View* in 1971 which discussed some highlights of computer history. I have a copy. You might refer to it for material for your computer history magazine.

Theodor H. Nelson's greatest achievement was, in my opinion, a book titled *Computer Lib/Dream Machines* in 1974. I purchased thirty copies of this book from Hugo's Book Service for various luminaries in computer history, including Dave Evans, Ivan Sutherland, Henry Fuchs, Jim Crow, Rudy Krutar, Martin Newell, Ron Resch and myself. I just glanced through one of my two copies and see no evidence of the *Radio Electronics* 8008 computer or the Altair 8800 which followed.

I had Henri Gouraud as a Fortran instructor when he was a grad student. The Gouraud Shading Algorithm.

I was a participant/victim when the "Janice O'Conner" scam swept the ARPAnet. I might even still have the old Teletype transcripts around somewhere.

Did you want real history or just the senile memories of an old neverwas? Seriously, I hope your computer history magazine is a big success.

Bruce Gold Utah (from the Internet)

The Internet is truly an interesting place to visit. Bruce wrote to me in reference to a posting I made in one of the newsgroups. It's incredible to think about how many people I have met by e-mail on America On-Line and from Internet newsgroups like; alt.folklore.computers, misc.forsale, misc.forsale.computers.other and many others. I urge everyone to try out the Internet. If you go to a book store, look for one of many current computer magazines that have a free trial disk of America On-Line on the cover. You will get ten hours free and you can access the Internet. Use keyword "Newsgroups'.

Did anyone recognize some of the things Bruce spoke of? -DG

David,

I'm glad to see your reachable through the Net. I've been meaning to write you, but this is certainly more convenient.

Firstly, thanks to your review in the HB a couple of issues back I tracked down a copy of Dr. Haddocks book, A Collector's Guide to Personal Computers. I enjoyed it immensely and have written him in the last week with my thanks and comments. Several of my computers were not listed and I offered my assistance in gathering the info. One of them was my DOT portable which you had not heard of. Don't be surprised if you see it in volume 2! I enjoy the newsletter, especially the new format!

Allan Hamill Bryans Road, MD

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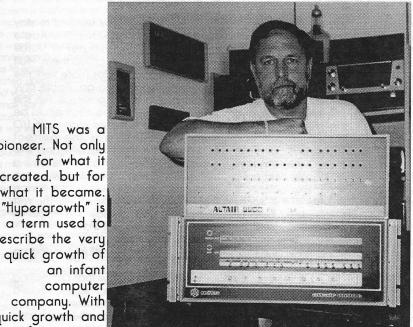
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MITS' FINAL DAYS

AN INTERVIEW WITH FORMER MITS EMPLOYEE STEVE SHEPARD The good times, the fun times and the end times!

By David A. Greelish



Steve Shepard of MSRC in his office with his Altairs.

teve Shepard lives in Albuquerque, NM. He is the owner of Microcomputer Service and Repair Center (MSRC). MSRC is a company he started shortly after his experience working for MITS, the company which brought the world the first true commercial microcomputer. I talked with Steve a little about his memories of the Altair, MITS and his last days there. Here are some highlights from our conversation:

When did you first start working at MITS?

Around 1977, just after the buy out of MITS by Pertec, Corporation and about two years before it went out of business.

What was MITS like when you started there.

It was a pretty neat place to work. Now, I wasn't in the manufacturing plant, I worked in the customer service division. I was inthe service department fixing mostly customer returns and machines which had flunked the Q & C tests. We worked four day work weeks, ten hours a day. The Altair 8800b was the hot item at the time I arrived. I think they had graduated from the 8800a by then. Pertec had just taken

over and they canceled all of the neat hobby stuff. The music board is one hobby item I remember which got canned. It was a shame, but they wanted to concentrate on business sales. They fired a whole lot of people and then slowly began to hire a lot of them back. Pertec changed things around a lot. They didn't really care about the hobbyists or techies which built MITS into a major computer company. The hobbyists were the kind of people you had to be in the beginning to use an Altair, Overall, I think Pertec mismanaged MITS from the start.

Dld you own an Altair before you got the job?

Yeah, I owned an Altair 8800a that I had built from a kit. I had been trying to get a job at MITS for a couple of years because I liked their computers. For a person like me, MITS was a status place to work back then. Some of my friends were jealous that I got a job at MITS.

What were some of the differences in the Altair models?

The first Altair was the plain 8800 which was announced in the January issue of Popular Electronics. It had a four slot motherboard that could be daisy chained with other MITS Altair four slots up to sixteen slots. I think just the basic machine came with only the four. Plus, it had a fairly weak power supply which probably couldn't handle sixteen S-100 cards if it tried. That's why the IMSAI was so popular, because it had an enormous power supply you could probably launch a rocket with! Then the 8800a came out as an improved version. It had an eighteen slot motherboard. The chassis looked just about the same as the original except for the "a" after "8800". By the way, the original Altair looked nothing like the one on the cover of Popular Electronics. That was some weird thing, I never saw an Altair that looked like that. It was just a mock-up for the picture - an empty box. The Altair 8800b was an even better version of the original, with flat front panel switches instead of the rounded ones which could hurt your fingers after a while. Later, MITS came out with a "turn-key" model that didn't have switches or LED's at all. We also sold the Altair 680 which didn't use the Intel 8080 cpu,

quick growth and big success. come big pressures. Ed Roberts, the owner of MITS and the creator of the Altair felt that pressure and decided to sell his company. Thus began the end at MITS.

MITS was a

for what it

pioneer. Not only

created, but for

what it became.

describe the very

quick growth of

an infant

computer

8080 cpu, but the Motorola 6800.

Did MITS bring any publicity to Albuquerque?

No, a lot of people didn't know who they were. You know, now everyone knows what a personal computer is, but back then if you said something about a personal computer, people would think you were talking about a calculator. They didn't really know what a general purpose computer was. There was no way for MITS to communicate to the general public what it was they were doing. You had to be a technical or hobbyist type of person to have heard of us.

Did MITS have an in-house software division?

Well, that's how Bill Gates got his start with Microsoft, but they had already established there own offices by the time I got there. They did continue to develop MITS BASIC and I think FORTRAN for a while longer though.

Did you ever meet Ed Roberts the founder of MITS?

I saw Ed Roberts once I think, just before he left MITS for good, but I never really met him.

Do you remember any particularly funny stories from your days there?

Oh veah, I remember I went to the local VA hospital once on a service call and they were using an Altair to do experiments on frog legs! They were giving electrical impulses to these frog legs by hooking them up to an analog to digital board inside the Altair. When the frog legs would twitch, they would pull a strain gauge connected to the A to D converter and the converter would measure that amount and put it into some kind of database! Kinda strange, but neat. Then there was the time I had to go to Phoenix on a service call. This company called us up and said that there was something wrong with their computer and that it was dead in the water. I tried to troubleshoot it over the phone, but I was talking to the secretary and she didn't know anything about computers much less how to even open the case. So, I said OK, I guess I'll have to come out there and check it out, but it will be pretty expensive for all the time and travel. I told her we could easily hit maybe a \$1000 for repairs, but she insisted. So, I flew to Phoenix and she picked me up at the airport. I went to their office, took the cover off and all that was wrong was that the connecting jumper wire was unplugged to the cpu! Someone must have sabotaged it because it was unlikely that it could have happened by itself. Her boss was not pleased!

Do you remember the most messed up Altair you ever worked on?

I do remember this one guy. I had talked to him on the phone about an expensive 16K static RAM card he he had bought as a kit. It was the top of the line Altair board which sold for about \$700! He kept saying, "It just won't work!" So I told him to go ahead and send it to me and told him our rates. About a week later I got it and the auv had been all thumbs! He didn't know how to solder, didn't read the instructions and practically put every chip in backwards because he couldn't find pin 1. He must had used something like a monster 500 watt soldering iron because all of the traces were lifting up off the board! Everything that could go wrong did. So I called him and told him that the job was botched. I think he knew that when he sent it.

Lets talk now about what happened when MITS closed down.

It happened suddenly one morning. There were about 250 or so employees between our location and the main offices. One morning the big shots from Pertec headquarters in California came in with a bunch of security guards (which we called "storm troopers") and they told us that MITS was being closed down and that a guard would escort employees to there work locations with a box. You were to gather up your personal belongings and go to the check out area. They checked what you were taking and wrote everyone a check. I ended up coming back after a few days to work for about another week doing service. Here's a funny story - I was mostly a field service repairer and I had been assigned a company car. I guess if I had been dishonest, I could have just kept the car when they were closing down MITS because the big shots from California had no clue that I even had it. When I left, I had turned the car in to the man who was sort of in-charge of the closing. That night, he went to a restaurant in the car and when he came out, someone had

taken an ax to it! There were big holes all over the car! He immediately thought that I had tracked him down and destroyed the car because I was mad at losing it. The next day he found out that there had been a drunken fight outside the restaurant and a guy who was swinging the ax at another guy, just tore up the car out of anger.

Did you think about working for Apple or another computer company in California?

Oh no, I really wanted to stay in Albuquerque. Besides, The Apple wasn't an S-100 computer or "Altair Bus" computer as we called them. I felt the Altair Bus was a lot more versatile and really the way to go. Apple only had one or two I/O ports just like the IBM has today, but the Altair could be configured to have as many 128 I/O ports! The Altair was the perfect computer for the hobbyist and the programmer and the Apple was a better consumer computer. We were all stupid, we were looking at it from a techie, engineers perspective. The rest of the world clearly saw the Apple as the better tool for real work.

Had you noticed any clues leading up to this closing?

Oh yeah, now that I'm looking back on it, Pertec had also purchased ICOM and immediately closed it down. They also took over another company which was repairing Phillips minicomputers and immediately closed that company down too. Shortly after that, they closed us down. I really felt sorry for all of the customers that were left hanging after our closing. There were a lot of people from all over the world who still had computers in service to be repaired. As far as I know, they never got their computers back. MITS had been a good company which tried to take care of their customers, Pertec was just a big company.



ICOM version of Altair 680b (unreleased) & the Altair 680b

KAYPRO KORNER

THE CONTINUED UPS AND DOWNS OF KAYPRO'S GROWTH An examination of early computer marketing.

By Erroll Foldes

Can a family owned computer corporation handle the big time? "The relaxed and entrepreneurial family-business style of running the company just did not work in what was becoming an extremely cutthroat market where only those who could anticipate and respond to rapid changes would survive."

n 1984, Kaypro had the best sales year in their history, but it also marked the beginning of the end for Kaypro Corporation. The inertia caused by the expansion of the prior year led Andrew Kay to over-invest in inventory; the parts he bought were fast becoming obsolete due to the industry-wide race for IBM-compatibility and 16bit technology. Son, David Kay, marketing manager, after unsuccessfully arguing with his father over these unwise business decisions, finally moved his office to the loading dock so he could head off the shipments before delivery. Parts inventory became so huge that the Kays set up huge white circus tents to serve as a makeshift warehouse for over \$50 million in surplus components. These were ultimately robbed, causing millions of dollars in losses. Family feuding and lack of concentration on managing the company's phenomenal growth, complicated business operations contributing to the firm's ignorance of market changes. Kaypro was also developing a reputation for bookkeeping carelessness and errors.

Perhaps their greatest mistake was continuing the manufacture of CP/M-based computers for so long as was reflected in their 1984 product line. The flagship Kaypro 2 was still there, upgraded with the Z80-A chip which boosted speed from 2.5 to 4 Mhz. The machine, still sporting the diminutive 191K drives, listed for \$1295. A variant of the Kaypro 2, called the 2X, was available for \$1595 and contained doublesided, double density drives. To differentiate it from the 2X, the Kaypro 4 got an internal 300 baud modem as standard equipment, and listed for \$1995. The Kaypro 10 remained unchanged in form and price. To round out the CP/M line, a lower priced variant of the Kaypro 2 was offered, it was called the "New Kaypro 2". It had only a single DS/DD floppy drive and cost \$995. It was at about this time that Kaypro developed their "universal motherboard" concept, whereby any of the above computers could be configured based on differing chips installed in a main board common to all of them. Until that time, each model had a unique main board, which was costly. A marketing strategy was to offer "Business Packs", which consisted of a computer and a daisywheel printer: The Junior Business Pack included a New Kaypro 2, the

Business Pack included a Kaypro 4, and the Senior Business Pack came with a Kaypro 10. On the software front, MicroPro's Wordstar was added to the offerings starting in April, 1984.

A new addition to the product line, called the Robie, would have been a knockout had it not "flopped". Sharing the familiar 64K RAM and Z80-A CPU, the Robie also had, shockingly, two high-density floppy drives with a whopping capacity of 2.6 megabytes each! The machine retailed for \$2295. Technical problems in production of the high-density drives delayed shipments. Another drawback was that the user had to format the special high density disks prior to use, rather than the disks being pre-formatted. To make matters worse, several recalls occurred due to faulty EPROMs, and Kaypro finally began offering Kaypro 10s in trade for ailing Robies. In short, Robies were either traded in or trashed, so if you own a survivor, hire an armed guard to watch it!

Finally, very late in the year, Kaypro introduced their first IBM-compatible computer, dubbed the Kaypro 16. First shipped in November 1984, the "16" was a 16-bit, 8088, 4.77Mhz IBM-XT compatible unit, running MSDOS. It had 256K of RAM, an available 10 meg hard drive, and one DS/DD (384K) floppy drive (standard configuration was with 2 DS/DD floppies). It shared the same portable, metalbox layout as its CP/M brethren, built-in green monitor and a connector for optional external color video. It's price tag was \$3295 with the hard-drive configuration, \$2295 with dual floppies. Although priced very reasonably, the 16 received poor reviews due to awful documentation, limited expandability, and poor graphics. Having jumped on the compatibility bandwagon this late in the game, and with growing internal problems, such a poor reception towards their first effort of IBM compatibility was needed like a hole in the head.

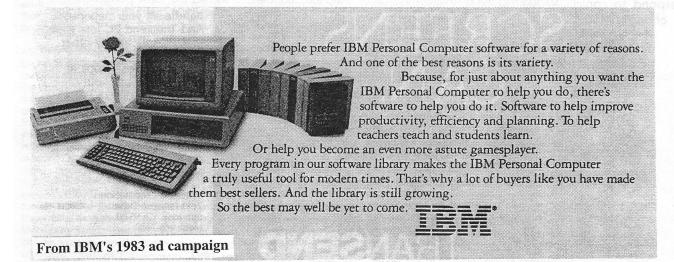
No fewer than 7 lawsuits were filed against the company during 1984, mostly for breach of contract and misrepresentations or omissions in the company's registration statement. Despite a flying start that year, Kaypro Corporation realized a net loss of \$267,683 for 1984, compared to 1983 net earnings of almost \$13 million. This loss was

mainly due to steady sales offset by the doubled cost of sales because of the tremendous inventory losses described earlier. The number of district sales offices dropped from 13 to 9, and employment dropped to 558 (Oct. 15) from an all-time high of 750 earlier in the year. Kaypro had continued a very aggressive marketing campaign in 1984, spending over \$10 million on advertising and promotions, including \$5 million on television ads. By 1985, employment dropped again, to 444 (Oct. 15).

1985 found Kaypro scrambling like mad to catch up with the competition. The former hot-selling Kaypro 2 was dropped altogether, but the hard-headed manufacturer still offered 3 computers that used the aging Digital Research operating system: A new one, the Kaypro 1, was the same as the prior year's 2X, but priced at \$995. The 2X and the 10 were still being offered, but now both came with a built-in modem and sold for \$1295 and \$2295, respectively. The XTcompatible Kaypro 16 was still available (both dual floppy (\$1995) and hard-drive (\$2695) versions), but added to the lineup were no fewer than 3 new DOS machines. The Kaypro PC, a direct IBM desktop PC clone with 256K and dual floppies, sold for \$1595, and included goodies like switchable CPU speed, Hercules emulation and a tremendous software package. The Kaypro PC claimed top honors in a November 1986 BYTE review/comparison of 3 8088 PC clones, winning over Epson and Multitech in terms of price, features, expandability and software bundling. Another was the 286i (February), which had the honor of being the industry's very first AT clone, and which originally came with dual high-density floppies for \$2995 and later with a hard disk for an amazing \$4550. At 20% below IBM's price, the 286i was yet another example of the tremendous value for the dollar that had become Kaypro's hallmark. Then finally, there was the blockbuster, the K-2000. This machine showed that Kaypro was still an innovator- it was one of the industry's first laptops; weighing in at 11 pounds, it was battery powered, had a detachable keyboard, 9" LCD 80 X 25 screen, a single 720K 3.5" floppy, 256K RAM expandable to 640K, real-time clock/calender, and a 16-bit, 80C88 that made it completely compatible with the IBM PC. Co-developed with Mitsui and Co., the unit retailed for \$1995, 30% less than similar units on the market. An optional 300/1200 baud internal modem was available for an additional \$295.

It would seem that with all of this quality production going on, Kaypro could quickly regain its prior stature as a leader in the PC arena. However, internal problems continued: In September 1985, Andrew Kay gave up the presidential title to son David, who in turn named John Hentrich executive vice president. David and his father continued to bicker over business matters, as the stubborn and headstrong Andrew still remained very much the one in charge, even with the loss of title. Continued communication problems led to expensive mistakes in sales and marketing strategies. The relaxed and entrepreneurial family-business style of running the company just did not work in what was becoming an extremely cut-throat market where only those who could anticipate and respond to rapid changes would survive. At the end of 1985, sales fell to \$75 million from \$119 million the previous year, and the firm again suffered a net loss, this time over \$15 million. This huge loss is mainly attributed to a \$14 million inventory write-off because of the obsolescence of 8-bit computers. 1986 saw the number of regional sales office drop to 6, and the dealer total drop to 900. For 1986, the product line was streamlined by the removal of the Kaypro 1 and 10 models, leaving just one CP/M computer offering, the Kaypro 2X (\$1295). Added was a new machine called the Expansion Unit Plus, a 16-bit, 8088-based desktop expandable to 768K by adding chips, and a 12" monitor for \$1195. In May, Kaypro introduced a special board that allowed their 8088based clone to operate like an AT. It cost \$1065, or \$799 with an 8088 Kaypro board trade-in. On the internal front, legal problems continued and the firm settled a 1984 shareholder suit for \$9.3 million in November. Kaypro actually made money in 1986, but it was a measly \$39,000! Not too good compared to the \$120 million peak of just two years earlier.

Next issue, 1987-1992: Decline, Bankruptcy and Liquidation. Plus, an analysis of the Kaypro rocket-ride and subsequent crash, and the factors that caused it, including commentary from the Kays themselves.



CANON'S CAT

THE SWYFT COMPUTER Or Jef Raskin's Macintosh computer?

By David T. Craig

computer named the Canon Cat. This computer was targeted to low-level clerical workers such as secretaries. After only six months on the market and with 20,000 units sold, Canon discontinued the Cat. The Cat featured an innovative text-based user interface that did not rely upon a mouse, icons, or graphics. The key person behind the Cat was Mr. Jef Raskin, an eclectic gadgeteer, who began the design of the Cat during his work on the first Macintosh project at Apple Computer in 1979.

The design and history of the Canon Cat is I am not a Cat owner nor have I been fortunate enough to have used a Cat. All facts within this paper are based on various documents relating to Jef Raskin and his work at Apple Computer and Information Appliance, Raskin's company that

CAT HARDWARE

The Cat was a 17-pound desktop computer system containing a built-in 9 inch blackand-white bit-mapped monitor, a single 3.5 inch 384K byte floppy disk drive, and an IBM Selectricstyle keyboard.

The product specs follow; Ezra Shapiro, "A Spiritual Heir to the Macintosh", BYTE magazine, October 1987:

n 1987, Canon USA Inc. released a new

a fascinating story which this article attempts to tell. created the Cat.

Dimensions Weight Components

17 pounds Processor, Motorola 68000 running at 5 MHz

Memory 256K bytes Mass storage

One 384K byte internal 3.5-inch

10.7 by 13.1 by 17.8 inches

floppy drive Display 9-inch black-and-white built-in,

bit-mapped Keyboard IBM Selectric-style plus several

special keys (UNDO & 2 LEAP) I/O Interfaces One Centronics parallel port, one RS-232C serial port (DB-25 connector), two RJ-11 jacks (for

telephone connections) Internal 300/1200 bps, Hayes compatible, auto answer/dial

ROM 256K bytes Price \$1495

CAT SOFTWARE

Modem

The Cat came with an extensive collection of applications stored in ROM. These applications supported word processing, spell checking, spreadsheet abilities, mail merging, calculator calculations, communications, data retrieval, and programming in the FORTH or 68000 assembly languages. Also present in the ROM was a spelling dictionary based on the 90,000 word American Heritage Dictionary. System setup information and a small personal user dictionary were stored in 8K of battery backed up RAM.

The Cat's user interface made this computer unique when compared to other computers. The user interface was based on a simple text editor in which all data was seen as a long stream of text broken into pages, which could also be broken into documents. Special keyboard keys allowed the user to invoke various functions. An extra key titled "Use Front" acted as a control key. You pressed Use Front and then a special key to activate a specific feature. For example, the L key was marked "Disk", the J key was marked "Print", and the N key was marked "Explain" (Cat's contextsensitive help facility). Other commands existed which let you change the system's various parameters (Setup key) and reverse your last action (Undo key).

When you powered on the Cat, you were presented with a display that looked like a typewriter with a sheet of paper. Black characters appeared on a white background. A ruler bar appeared at the bottom of the screen. The Cat's memory held around 160K of data which was equivalent to 80 single-spaced

professional writers almost exclusively to low-level clerical workers."

"The Canon Cat

did not sell well.

be attributed to

the hardware on

which it ran. as

well as Canon's

target this ideal

decision to

interface for

but this should

printed pages.

You moved through your data using two extra keys called "Leap" keys located in front of the space key and by typing strings of characters. The Cat jumped to the next occurrence of that string. Raskin claimed that the Cat's Leap-key search method to scroll from the top to the bottom of a page took 2 seconds, a mouse took 4 seconds, and cursor keys took 8 seconds. Larger documents increased these search ratios.

The Leap keys also controlled text selection (indicated by hi-lighting), deletion, copying, and moving. If the selected text was a mathematical formula, one keystroke with a special key calculated the mathematical result and the answer appeared on the screen with a dotted underline overlaying the original formula. If the selected text was a computer program written in either FORTH or 68000 assembly language, then a special key let you execute the program (I don't think many Cat users did any Cat programming). You performed mail merges by selecting columnar text data and pressing another special key. Repetitive command sequences could be automated by assigning commands and text strings to the Cat's numeric keys. One special key let you dial a selected telephone number either for voice or modem communications. Data received from the built-in modem flowed into your text as if you had typed it.

The Cat used a 384K floppy disk for storage. Each disk held the entire contents of the Cat's memory in addition to system configuration parameters, the user's personal spelling dictionary, and the bit-map for the screen. When you inserted a disk, the Cat read the disk's entire contents into the Cat's memory including the last saved screen image. This feature allowed users to transfer their entire Cat environment to another Cat by just taking their disk from one Cat and inserting it into another Cat.

The Cat's simple but powerful user interface received many plaudits. For example, Bruce Tognazzini, a computer user interface guru who worked for Apple (he now works for Sun Microsystems), had the following to say about the Cat (TOG on Interface, 2nd printing, 1992, p. 182): There are some really good abstract interfaces, ... Jef Raskin's Canon Cat interface is another. ... Before he left the (Macintosh) project, Macintosh was far more dependent on the keyboard, and Raskin knew what to do with the keyboard, too. For example, the Find function on the Canon Cat is some 50 times faster than the same function on the Macintosh. Raskin didn't use "Commandkey equivalents": he designed a true keyboard interface from the ground up.

Ezra Shapiro in his "A Spiritual Heir to the Macintosh" article had the following

to say about the Cat: The Cat represents an eye-opening new approach to data storage and retrieval; it will surprise anyone who thought that interface design was a dying art. Though the basic configuration appears on the surface to be a flexible word processor, the Cat's computational, macro, and programming capabilities make it quite possible to build data structures that emulate spreadsheets and databases.

Raskin had the following to say about the Cat and the Apple Macintosh in a personal letter dated July 1987: It is as advanced (in terms of human interface) over the Mac as the Mac was an advance in its day. Raskin's thoughts on the Cat's user interface and other user interfaces from the perspective of 1994 follow: (The Mac and Me: 15 Years of Life with the Macintosh, Draft copy, May 1994) The current paradigm of using application programs is inherently wrong from an interface design point of view. This is widely recognized, but the solution offered is to make them interoperable, which solves some of the problems but by no means all. GUIs as presently designed and used are an interface dead end. Though they can be patched endlessly, a large jump in usability can only come from a completely different approach. The Cat computer, which I developed for Canon, demonstrated that my alternate approach is implementable and both more productive and more pleasant than GUIs.

JEF RASKIN AND THE FIRST MACINTOSH

One can say that Jef Raskin began designing the Cat during his tenure at Apple Computer. He started at Apple in January 1978 as head of its publications department. From 1979 to 1982 Raskin was responsible at Apple for a research project called Macintosh. He resigned from Apple in February 1982 when he was Manager of Advanced Systems over a disagreement with Steve Jobs, one of Apple's founders. concerning the Macintosh's direction. Steve Jobs took over Macintosh development and the Macintosh became a mini-Lisa computer which was substantially different from Raskin's original ideas for the Macintosh.

In Raskin's paper, "The Genesis and History of the Macintosh Project" (February 1981), he provided his thoughts on the main software design criteria for the Macintosh: My concepts in designing the software were extreme ease of learning, rapid (and thus non-frustrating) response to user desires, and compact and quickly developable software. Key elements in designing such a system are freedom from modes, the elimination of "levels" (e.g. system level, editor level, programming level), and repeated use of a few consistent and easily learned

concepts. Such software also leads to simple and brief manuals without having to sacrifice completeness and accuracy. The editor is similar to the LISA editor but does not require the expensive mouse. A careful study showed that it is probably faster to use than a mouse-driven editor -although it is probably not as flashy to see when demonstrated in a dealer's showroom.

In 1994, Raskin had the following to say about the original Macintosh's software design: My unifying software originally was to be a graphics-and-text editor within which applications could run as additional commands (via menus), all input and output being through the interface designed for the editor. Later, the PARC desktop metaphor was adopted from the Lisa group (and that from the Xerox Alto and Star computers). Due to the incredible work of the Mac. software team, the necessary code was designed and squeezed into a Toolbox that fit into a relatively small ROM (Read Only Memory) that we could afford to put into the product.

Raskin also had some interesting comments to say in one of his many Macintosh design memos concerning the intended users of the Macintosh ("Design Considerations for an Anthropophilic Computer", 28-29 May 1979): This is an outline for a computer designed for the Person In The Street (or, to abbreviate: the PITS); one that will be truly pleasant to use, that will require the user to do nothing that will threaten his or her perverse delight in being able to say: "I don't know the first thing about computers".

The Macintosh's early hardware design was very similar to the Cat's design. One early Macintosh design from January 1980 provided a small screen, a keyboard, and two vertical built-in disk drives. Also present in this early Macintosh design was a built-in printer.



One of many preliminary Mock-ups of a Macintosh computer (circa January 1980)

INFORMATION APPLIANCE, THE SWYFTCARD, AND THE CANON CAT

The company that Jef Raskin founded in 1984 to implement his computing ideas was located in Menlo Park, California and was named

Information Appliance, Inc. Raskin's ideas about computers and the basic concepts for this company are summarized in his white paper Information "Appliances: A New Industry" (February 1986): One of the prophets of the personal computer industry, Alan Kay, has said that the true personal computer has not yet been made. I disagree. We have, as the ancient curse warns us, gotten what we asked for. We do indeed have computers being bought by individuals for themselves; they are "personal computers". The problem is that many of us didn't want computers in the first place -- computers are merely boxes for running programs -we wanted the benefits that computer technology has to offer. What we wanted was to ease the workload in informationrelated areas much as washing machines and vacuum cleaners ease the workload in maintaining cleanliness. By choosing to focus on computers rather than the tasks we wanted done, we inherited much of the baggage that had accumulated around earlier generations of computers. It is more a matter of style and operating systems that need elaborate user interfaces to support huge application programs. These structures demand ever larger memories and complex peripherals. It's as if we had asked for a bit of part-time help and were given a bureaucracy.

Information Appliance's goal was to create a computer system that would be both powerful and easy to use. The company developed a prototype Cat system code-named "SWYFT". Doug McKenna, a former company director and now the key person behind the Macintosh development tool Resorcerer, said that he proposed that "SWYFT" be read as "Superb With Your Favorite Typing". Funding for this company came from around a dozen venture capitalists.

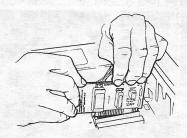
Raskin's business plan was to create and market the Cat using only Information Appliance. But the company's backers thought Information Appliances could not do this as well as a bigger and already-established company. As such, the venture capitalists talked with several computer companies that had an interest in the Cat and selected Canon to market the Cat. Canon was responsible for giving the "SWYFT" the product name "Cat".

While the Information Appliance engineers developed the Cat, the company's venture capitalists thought it would be beneficial for the company to release some of the Cat's technology as a small board-based product. The result of this was an add-on plug-in board for the Apple //e computer. This card was called the SwyftCard, a name which obviously was based upon the Cat's code name. The SwyftCard's retail price was \$90. It is interesting to read Raskin's comments concerning the origins of the SwyftCard (*Programmers at Work*, p. 237): We didn't

get into business to produce a board for the Apple //e, but it seemed like such a good idea that I would have felt very bad not to have released the product. I saw a lot of good products at Apple and Xerox pass from desktop to desktop, and never get to the market.

Information Appliance wrote the SwyftCard's on-board software in FORTH, a computer language which Raskin saw as ideal for this product since it was compact and inexpensive to implement. Raskin's comments about how he hired a FORTH programmer show the distance Raskin had traveled from Apple, at least from a legal perspective (Programmers at Work, p. 238): I went out and hired a FORTH programmer and a few other people, mostly personal friends of mine. Nobody from Apple. I didn't touch the company. I didn't want to get into any legal hassles, and Apple was nasty enough then that I worried about such things.

The SwyftCard was well received



Installing SwyftCard in Slot 3

by those who used it. One magazine reviewer had the following to say about the SwyftCard (David Thornburg, "The Race goes to the Swyft, A+, p. 86): SwfytCard is a small, multipurpose circuit board that plugs into slot 3 on an Apple //e, turning it into one of the most useful tools you could ever want for word processing, information retrieval, calculation, BASIC programming, and -- if you have a modem -- communication. SwyftCard has accomplished something that I never knew possible. It not only outperforms any Apple II word-processing system, but it also lets the Apple //e outperform the Macintosh. The SwyftCard reviewer also had the following to say about the philosophy behind the SwyftCard: SwyftCard was the result of extensive thought about how people might want to use computers if they had a choice in the matter, and as a result is a spectacular piece of programming.

THE CAT'S DEMISE

After six months as a product, Canon discontinued the Cat in 1987. Bruce Tognazzini, a computer user interface guru, had the following to say about the Cat's demise (TOG on Interface, 2nd printing, 1992, p. 182): The Canon Cat did not sell well, but this should be

attributed to the hardware on which it ran, as well as Canon's decision to target this ideal interface for professional writers almost exclusively to low-level clerical workers, who didn't need its functionality and were confused by its "invisible " interface.

Some people have said that the reasons for the Cat's demise were political. One story says Canon's electronic typewriter and computer divisions fought for control of the Cat. Canon's president learned of this fight and ordered the divisions to resolve the matter soon. The matter was not resolved and the president canceled the Cat to teach the divisions a lesson. Another story contends that when Canon wanted to invest in Steve Jobs' new post-Apple company, NeXT, Jobs told Canon that it could invest only if Canon dropped the Cat. Jobs supposedly was very hostile toward Raskin since Raskin had created the Macintosh and Jobs could not stand to be associated with him in any way. Canon did buy around 16% of NeXT stock in June 1989 for \$100 million. When interviewed in 1986 Raskin answered the interview question "What do you think is the biggest problem your business faces?" How in the world do you sell something that's different? That's the biggest problem. The world's not quite ready to believe. It's like in the early days at Apple, they said, "What's it good for?" We couldn't give a really good answer so they assumed the machine wasn't going to sell. But I do know the way I plan to sell my product is by word of mouth. Some people will try it and say, "This product really gets my job done. It doesn't have fifteen fonts. I can't print it out in old gothic banners five feet long, but I sure got that article finished under the deadline." That's how I can sell it. Later, people will understand it. In retrospect, it appears that most computer users just didn't get it when it came to the Cat.

In 1989, Information Appliance ended. Doug McKenna, one of the company directors, claimed that the venture capitalists behind Information Appliance no longer wanted to be part of what they considered a risky venture so they pulled out their financial resources causing the company to close its doors. Information Appliance also had on the drawing boards at the time of its demise a 2-lb. Cat laptop! Only around two were ever built.

Jef Raskin currently owns the patents that formed the Cat's core technology. These include a patent for the Cat's LEAP method and the saving and loading of all the Cat's RAM to disk and from disk. Information Appliance licensed several of these patents to other computer companies, but to date nothing has been done with this technology. Raskin claims that in a few years some products may appear with CAT-like features.

BABY BLUE

THE IBM PCjr, AN EXERCISE IN BAD PLANNING? IBM's little mistake?!

By Michael J. Posner

n 1983, the home computer market was heating up at a rapid pace. Parents were being told that unless they purchased a computer for their children, they would have no future. IBM, then the leader in the business personal computer market, decided to produce its own home computer. IBM's studies showed that parents were not willing to spend the large sums of money needed to purchase a computer (approximately \$3,000.00 in 1983 dollars). The magic number was less than \$1,000 for a machine, with a maximum of \$1,500

magic number was less than \$1,000 for a machine, with a maximum of \$1,500 for a system. They also established that a home machine had to support sound and color. The machine, code named Peanut, was the talk of the industry prior to its release. Up until this point, IBM still had a stellar reputation, and everyone presumed that the Peanut would be a killer machine.

Rumors flew throughout the computer

press for the next big IBM debut. Unfortunately, the expectation far exceeded the outcome. By 1983, control over the IBM personal computer division had been removed from the maverick creators who produced a machine in one year to the bureaucratic, mainframe mentality, stuff shirt bean counters in Aramonk. They feared that a machine that could run all of the software for the IBM PC and XT would result in a loss of sales to those machines, with their 50% margins. So instead of a PC for the home, they created the PCjr, a machine with such limited capabilities, that it falled miserably in the market place. The original junior consisted of a small unit box housing the main processor board, 128k of ram and two cartridge slots for programs. With an RF converter one could purchase the junior for about \$600.00. Simply plug the junior into your TV, slip a program in the cartridge slot and you could compute. While \$600 seemed cheap, at that time you could easily pick up a Commodore 64 or Atari 800 with a floppy drive for a hundred or two less. To accomplish any meaningful tasks, you needed a full junior setup. Added to the junior were a 5.25" floppy drive holding 360K of data, a color RGB monitor specially designed for the junior, allowing 16 colors on the screen at any one time, a parallel port sidecar and a thermal printer. Total cost new of about \$1,500.00. This placed the junior squarely in the Apple II area, then the most

popular home computer. Apple also matched the introduction of the junior with the Apple IIc, a machine with similar capabilities and limitations. IBM spent a lot of money trying to get consumers to buy the junior. Despite this effort the junior still failed. The junior had several weaknesses that sealed its fate. Despite a clever infrared connection, the inclusion of a chiclet key keyboard made the initial junior appear like a toy. Even the Commodore and Atari had real keys. IBM finally recognized its

mistake and gave everyone a new keyboard with regular keys. The junior lacked slots to plug in expansion boards. Ram was also unexpandable. With only 128k ram, the junior could not run many of the more powerful PC programs such as Lotus 1-2-3. While the junior could read the PC's disks, it frequently could not use the data since the program would not run. This eliminated most work at-home buyers from considering the junior.

The junior did have a few pluses though. The built-in color graphics were superior to the PC, as was the sound. But, without a large installed base of machines, few programs were ever written specifically for the junior. The junior also had two cartridge slots. These were proprietary to the junior. Eventually, some software was released on cartridge, including a scaled down version of Lotus 1-2-3. Despite initial strong sales over the winter of 1983, sales quickly fell. The junior's failure was also helped by the general decline in home computer sales overall. Less than eighteen months later, IBM ceased production of the junior, leaving reputed thousands of machines in its warehouse. The junior's failure led to a string of other embarrassing systems from IBM including the portable, convertible, and the micro channel systems. Despite the juniors failure, there was a strong effort to save junior users in the mid-eighties. Using the side expansion bus, users eventually added more ram, higher density floppies, and even hard drives eventually reaching IBM XT levels of performance.

The junior should be studied in business schools as a classic case of poor planning. Users will never except a machine that is underpowered and overpriced without a compelling reason. Unfortunately the junior never gave any reason, and it left many poor

users in its wake.

It was 1983. IBM
had the business
computing market
firmly in hand.
but they sought
to capture the
home market as
well. Thus. the
PCjr was born.
but was its birth
a little
premature?!

MERGER MADNESS

FROM GYROSCOPES TO COMPUTERS The Pre-History of UNISYS

By Mark Greenia

UNISYS. one company or a pack of many?
"The new UNISYS. now with a somewhat heterogeneous computer product line. started producing its first 80386 based microcomputers in 1987."

ost people will recognize the name UNISYS, the second largest computer company in the world. UNISYS ("UNIted SYStems") was formed by the 1986 merger of two Fortune 100 companies, Burroughs and Sperry. Although mergers and acquisitions in the computer field are nothing new, the colorful history of UNISYS and its predecessor companies provide a fascinating example of the eclectic evolution of the computing industry and sheds a spotlight on some of the entrepreneurial talent of early business pioneers.

The Burroughs name dates back to 1886, when the American Arithmometer Company marketed the adding machines invented by William Seward Burroughs. It officially became "Burroughs Adding Machine Company" in 1905. Burroughs seriously entered the digital computing arena in 1956 with the purchase of ElectroData Corporation, makers of the Datatron, a successful mid-sized computer.

Sperry's roots date back to 1910. In that year, Elmer A. Sperry, a brilliant inventor and businessman, founded "Sperry Gyroscope Company," makers of gyro compasses and other directional finding devices.

Sperry Corporation used to be called "Sperry Rand." "Rand" came from the family that operated the "Rand-Kardex" office machine business. In the early 1920's, James H. Rand, Jr. built a \$10 million dollar business based on his father's patented record keeping system. In 1927, his company, Rand-Kardex, merged with five different companies: Remington Typewriter, Dalton Adding Machine Company, Powers Accounting Machine Corporation, and the Safe Cabinet Company. The new combined company was called "Remington Rand.' The name "Remington" had of course been famous since Eliphalet and Philo Remington ran the Remington Arms Company in 1828. They produced the successful Remington rifle. Having excellent business and factory skills, and seeing a potential new industry, the Remington's bought the rights to Christopher Sholes' early typewriter machine in 1873. By 1893, Remington was not only producing typewriters, it had bought out or merged with several competitor companies: Standard Typewriter Company, Yost Writing Machine Company, Monarch Typewriter Company, Densmore Typewriter Company, and the Smith Premier Typewriter Company. Oh, yes, they also made sewing machines. (Still with me? Ok, there's more to come.)

In 1950, Remington Rand purchased the Eckert-Mauchly Computer Company (the first real computer company in the United States). J. Presper Eckert and John Mauchly were the designers and builders of the ENIAC (1946) and the UNIVAC (1950), two of the most famous names in early digital computers. The Eckert-Mauchly Computer Company, now absorbed by Remington Rand, became its "UNIVAC Division." For a while, the whole company was promoted in advertisements as "Remington Rand UNIVAC" since the name "UNIVAC" had become almost synonymous with computers. In 1951, UNIVAC I became the first commercially available computer. In 1952, Remington Rand bought Engineering Research Associates (ERA), leader in electronic communications and cryptographic equipment. When Sperry joined up in 1955, the name of this whole collection of companies was changed again, this time to "Sperry Rand."

In 1971, Sperry Rand expanded its computer business when it paid \$490 million for RCA's computer operations. RCA was eager to get out of the highly competitive computer field. In 1979, Sperry Rand decided to change its name to "Sperry Corporation." Sperry made a variety of computer equipment, including the Sperry Personal Computer.

Burroughs, meanwhile, was busily making and selling computers and had acquired companies such as Systems Development Corporation (SDC) and Memorex. Each concerned by the growing competition in the computer field, and slightly uncomfortable sitting in IBM's megalithic shadow, Burroughs and Sperry Corporation worked out a merger in 1986 that created a single \$10.5 billion dollar company, with over 90,000 employees in over 100 countries. The new UNISYS, now with a somewhat heterogeneous computer product line, started producing its first 80386 based microcomputers in 1987. The merger has apparently strengthened the company's position somewhat. In 1993, NASDAQ Stock Market, Inc. signed a five-year, \$25 million contract with UNISYS for two of its 2200/900 mainframe computer systems. The UNISYS systems and support will be used to handle NASDAQ's 800 million share per day trading volume, at its Trumbull, Connecticut and Rockville, Maryland data centers. Certainly a long way from gyroscopes, typewriters and sewing machines!

(Mark Greenia is the author of the "Encyclopedia of Computer History," Lexikon Publishing.)

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Apple IIe, Dual 5.25" floppies, 128k RAM (with 80 column card), Monochrome monitor, Imagewriter Printer I. I'm considering any price. Otherwise, I intend on donating it to some school/children's organization. Mike Nielsen, PO Box 13200, Reno, NV 89507. (916) 773-2462 H, (916) 785-3293 W.

Commodore B128, Model 8050 double floppy disk drive, 4023 dot matrix graphics printer and a monochrome monitor. Last time the system was assembled, everything worked fine. I also have Superscript II wordprocessing software and tech manuals. Want to sell whole thing as a package, but will sell separately. Make me an offer. Evan Harris, Email: eharris@kinison.ots.utexas.edu

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Old Atari 800 for sale with tons and tons of software (mostly games), and all the accessories (joysticks, cables,etc..). All for \$125.00. Todd Munk, 1111 Privet St., San Marcos,CA 92069. (619) 739-8742, E-mail: tmunk@qing.ucsd.edu

Original Atari 800 that works great -has Omnimon machine language monitor installed and also an XLswitch so it can work like an XL with the alternate chipset. Original 810 drive that has been enhanced with the Atari archiver chip. Lots of software too -- carts and disks. Okimate 10 color printer (if you can find the color ribbons, works great) with an Atari plug'n'play interface module. KoalaPad with software, WICO joystick, etc. All power supplies, cables, bag o' extras and goodies (cables, chips, ROMs, etc.) Best offer over \$200. David Newman, 121 Rodney Circle, Bryn Mawr, PA 19010. 1-800-288-8221 (work) EST 8-5pm.

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Kaypro II, 1982(?), slight video problems, two SS/DD floppy drives (192 Kbyte each), hardware documentation (schematics, etc), full software and docs, CP/M 2.2, Perfect Writer, Perfect Speller, Perfect Filer, Perfect Calc, Kermit, MEX, Emuterm, Modem7, Small C, MBasic, CBasic, SBasic, 8080 assembler, debugger, Z80 assembler, disassembler, ASCII video games, Ladder, aliens, pacman, others, diagnostic programs. Epson QX/10 in great condition, halfheight DS/DD floppy drives (360(?) Kbyte each), 256 Kbyte RAM, monochrome graphics monitor with separate video memory, expansion slots, light pen socket, MS-DOS 8086 expansion board and software, full dealer hardware documentation (schematics, etc), full software and docs, VAL-DOCS, Rising Star's fully integrated office system, CP/M 2.2, Eco C, Small-C, MBasic and games, NERD bulletin board software + more! Make offers (\$50 each?), they're just taking up space in my garage. You pay shipping. I'm supplying my work phone and address since I'll be moving across town soon. Shannon Nelson, AL4-58, 5200 NE Elam Young Parkway, Hillsboro, OR 97124. (503) 642-8149, E-mail:

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For Sale: Lear Siegler ADM-5 CRT terminal w/ docs, PERTEC 8" drives w/ docs, Shugart 8" drives w/ docs, S-100 chassis w/ pwr supply, GE TermiNet 300 printer terminal w/ docs (3), DEC 300/1200 modem w/ docs (2), S-100 cards (all in very good condition) - North Star disk controller MDC-A3, MDC-A4 (2), Canada CL2400 real time clock w/ docs, Cromemco D+7A I/O (2) w/ docs, Seals S8KMB memory (2) w/ docs, Dutronics 8KMB R1 A memory, WMC Inc. Mem-1 memory, Netronics "JAWS" 64K w/ docs, Seals 8K SC (2) w/ docs, CompuPro RAM 17, MITS 16 MCS Static (4), SD Systems, VersaFloppy II cont. w/ docs, SD Sales memory (2), DynaByte 32K memory w/ docs, PTCO 4KRA (2), Godbout Econoram 64K, MITS 16MCD (3) w/ docs, IMSAI S I/O, Vector Graphic Bit Streamer, MITS 88-C700C, IMSAI P I/O, Tarbell Polymorphic Video, cassette. Electronic Discount Sales ROM board, ARTEC 32K-100, assorted ICs (14+), WD21231B-00 chips (2), Solid State Music card & attac., IMSAI PIC-

8, Vector S-100 plugboard kit (unopened), S-100 testing boards (4), S-100 extensions (2) w/ docs, assorted breadboards (1 box), Vector R681-2 bus slots (4), CPUs (Z-80, 8080, 8088, 8086, 8085 - 12+ total), Eprom programmer w/ eproms (16+), (other boards listed may also have docs). Paper Tape - FOCAL 1/24/76, Proc Tech software #1, Cromemco Z-80 monitor w/ docs. All reasonable offers accepted. Call David at (915) 822-2683 between 7pm - 9pm MST or E-mail: Historical@aol.com

IBM, Commodore & CP/M public domain, Large assortment of software at huge savings. Send a SASE to: Hunt Electronics, 131 Agee Circle East, Hendersonville, TN 37075. (615) 824-1490

Complete, working PDP-8e minicomputer to sell, trade, or giveaway! Originally configured as a data communications switch from Digital Communications Associates (DCA). Comes with extended motherboard, 54 programmable serial I/O ports, "ASCII front panel" console interface (as well as the zillion frontpanel lamps and toggle-switches), heavy-duty external P/S in addition to the PDP-8e built-in. Rack-mounted in standard 19" six-foot rack, on wheels. Also included: lots of software (on tape!). paper-tape paper reader/punch(!), lots of documentation (including some schematics), and many spare boards. Terms: (1) Cash: no reasonable offer refused. (2) Trade: anything remotely useful for a Macintosh user. (3) Giveaway: if (1) and (2) are out of the question for you. The Catch: U-haul, from Clifton, VA area (about 20 miles west of Washington, DC). Best offer gets this priceless showpiece of 12-bit technology! PLEASE E-mail any offer to Stephen R. Holmes: sholmes@netrix.com

Original palmtop computer: HP75C, Circa 1982. 48K ROM, 16Kstd + 8K expansion RAM, 1-1600Hz beeper. Querty chicklet keyboard, magnetic strip reader, one-line (32 char window on 96 char line) LCD display, HP-IL interface, and I've got an external HP IL to RS-232 interface. Text formatter ROM cartridge. About 120 mag cards, charger, manual, case. Nifty clock calendar alarm system Programmable in HP BASIC. Still works. Asking \$200 obo. Jon Spear (408)655-5922 eves. E-mail JLSpear@aol.com

Z-100 with monitor. Best offer (anything reasonable). Bill Taffe, 108 Quincy Road, Rumney, NH 03266. (603)786-9836, E-mail: wjt@oz.plymouth.edu

Misc. - I have a keyboard and a dualbay DD floppy drive setup and some software (DOS, Lotus) for an HP touchscreen system. The screen part is where the CPU is housed - that's the part I don't have. If anyone wants it I'll be glad to give it away for the cost of shipping, otherwise it'll go into the trash when I get tired of tripping over it. Jonathan Welch, (413) 545 6535. E-mail: JHWELCH@ecs.umass.edu

Compaq 8086 PC: has two 5 1/4" 360K floppy drives, choice of CGA or mono card included, includes IBM keyboard. Fully functional. \$100 including U.S. shipping, prepaid. IBM # 5160 PC: has one 5 1/4" 360K floppy drives, 10 meg hard drive, choice of CGA or mono card included, includes IBM keyboard. Fully functional. \$125 including U.S. shipping, prepaid. Jerry Rakar, 21701 Roberts Avenue, Euclid, Ohio 44123. (216) 731-2656 Mon-Fri 3-9 P.M.

Alpha Micro AM1000 and 4 terminals. I would love to sell! This wonderful machine has a 30 Meg HD and about 764 K of dynamic RAM. Bill (305) 531-6014, Miami, FL.

2 Apple Lisa's (The pre-Mac, Mac!) These are for sale strictly to people who would want these for what they are... a piece of history. Both machines work... but need work. One has an internal Hard Drive, the other has an external Profile drive. Printers are included, along with some cables that are needed. No disks or manuals, sorry. I would like to sell these both at the same time (you could use one for parts) and these machines are sold as is. Best offer takes them! Gregory Johnson, Middletown, CT. (203) 635-9888, E-mail: GGJ@aol.com

APPLE II clone, Franklin Ace 1000, 9" monochrome (green) monitor, 5 1/4" floppy drive, 80 column card, with Panasonic KXP1091 printer, boxes, manuals, software, etc. All works, best offer. Sean Herninko, 53 Woodview Lane, North Wales, PA 19454. (215) 641-9476, E-mail: Kevinman@aol.com

Bally Astrocade videogame console. Rare mint condition unit in box with manual from around 1980-81 or so. Comes with 2 revised Bally Basics, one with box and instructions, as well as 2 controllers, Bally Pin, Biorhythm, Tornado Baseball, and Galaxian. All have docs and overlays except for Galaxian. Asking \$150 or best offer. Atari 1400XL prototype, custom fitted into a 1200XL case with mammoth power supply. Functional 64K XL/XE compatible machine with speech chip (V: device) and internal revision C Ataribasic. Incompatible PBI port design. Has Freddie chip so it can be upgraded like 65XEs. Internal 300 baud modem daughterboard in unknown condition (uses T: handler).

A great collector's item. \$150 or best offer. Glenn Saunders, 44 Virginia Rd., Needham, MA 02194. (617) 444-0299, E-mail:

krishna@max.tiac.net

Visual portable, dual floppy 512K portable computer, 1986. It has both the portable monitor and the regular monitor. Asking \$300 obo... have all software too! Beth Taylor, Jacksonville, FL, (904) 353-3181 (W), (904) 771-9181, E-mail: LadyLu272@aol.com

2 Osborne One's, one of which has the rare external monitor plug with it. I have no software for them other than a boot disk, but they both work fine. \$50.00 each, or \$75.00 for both. Timex-Sinclair 1000, with the 16k memory module, in original box with manual, along with a paperback book ("Timex Sinclair Personal Computer Made Simple"). \$50.00. Radio Shack MC-10 in original box with manual, a very limited release mini, similar to the Timex-Sinclair. \$50.00. Texas Instruments 99/4a, in original box. \$50.00. 2 CoCo II's, one works and the other is for parts. Both \$50.00. Bill Pfleging, 266 Broome St., Catskill, NY, 12414. (518)943-4486. All prices do not include shipping or COD. E-mail: Billbeau@aol.com

AT&T Unix-PC 7300 Unix box which I would like to unload. It is from '85, but was one of the first 68010 based Unix machines intended for departmental use. It also runs the One True Unix: System V r2. Best offer. Fritz Lowrey, E-mail:

jjlowrey@usc.edu

Atari 800 CPU, Atari 1050 Disk Drive, Atari 1025 Printer, Atari 1010, Program Recorder, Koala Pad, Wico Joystick. Manuals. Software: Atariwriter, Visicalc, The Home Filing Manager, Family Finances, Conversational German, Basic, Joust, Dig Dug, Pole Position, Donkey Kong, Star Raiders, Galaxian, Choplifter, The Seven Cities of Gold, Will Harvey's Music Construction Set, Hard Hat Mack, Archon, Wizard and the Princess, Zork I, Zork III, Castle Wolfenstein, Beyond Castle Wolfenstein, Star Trek, Lode Runner, Zaxxon, Flight Simulator II, Jumpman Junior, Temple of Apshai. All items are in excellent condition. I don't have boxes for the hardware, except the program recorder. All software includes original boxes and includes original documentation, \$100, Randal Mihara, 1778 Karameos Court, Sunnyvale, CA 94087. (408) 733-2938, E-mail: rmihara@sparta.sisu.edu

200 Apple Mac 512 motherboards and 70 Mac 128 motherboards for sale. I'm asking \$10 each for the 512 boards, and \$7 each for the 128 boards. Dave Zampino, 620 Alamo Ct, #4, Mountain View, CA 94043. (415) 967-6628, E-mail: davethez@netcom.com

TI-99/4a, I believe it's still functional. It has an RF modulator, original joysticks, a cassette interface cable, and several catridges (including an assembler). If you're interested, make an offer. Adam Roach, 4303A Boyett, Bryan, TX 77801. (409) 846-5954, E-mail: adamr@tamu.edu

If you are interested in good vintage S-100 Cromemco parts, systems or documentation contact me at E-mail: llhote@bigcat.missouri.edu - Lawrence L'Hote

Atari 2600 Systems: 4 switch or 6 switch consoles with 2 joysticks, 1 pair of paddles, 1 driving controller, and the following games: Laser Blast, Freeway, Skiing, Pitfall!, Armor Ambush, Super Challenge Football, Space Attack, Donkey Kong, Star Voyager, Frogger, Q*Bert, Solaris, Combat, Asteroids, Pac-Man, Space Invaders, Yar's Revenge, Missile Command, Berzerk, Defender, Night Driver, Street Racer, Home Run, Basketball, Breakout, Canyon Bomber, Warlords, Backgammon, Casino, Video Olympics, Outlaw, Circus Atari Football, Air-Sea Battle. Video Pinball, Surround. Asking price \$65 plus shipping, 4 Systems available with this configuration. System as listed above without games \$30 plus shipping. Basic Programming, Hunt & Score, Codebreaker, Brain Games and 1 keyboard controller - \$20. Many, many additional carts for the 2600, 5200, 7800 - write for list. Intellivision Systems & Hardware: INTV 1 - \$20, INTV II w/ P/S - \$25, Intellivoice w/ Bomb Squad, Tron Solar Sailor, Space Spartans and B-17 Bomber -\$30. Dozens of carts available! Colecovision Systems: Console with 2 joysticks, power supply, video cable, Expansion Module #1 (Allows you to play 2600 games) - 4 systems available in this configuration. Systems include Donkey Kong, Venture and Zaxxon - \$50. Plenty of extra games available! Oddysey 2 Main Console w/ Speedway/ Spinout/Crypto-Logic, Take The Money & Run and War Of Nerves -\$25. Shipping is not included in these prices, which typically runs \$2.90 for up to 15 carts, \$10 for systems. I am open to trades of all kinds, and will consider package deals. Larry Anderson, University of Michigan, Email: larry_a@netcom.com

For Sale: 1 working TI-59 calculator with 3 modules, 2 speech boards, 2 computalker boards - 1 with music capabilities, 3 16k tdl memory boards, 2 64k boards (1 full and good), numerous 8k processor tech boards, 3 sa800 drives 8 inch, 2 MPI 40 track drives, original FDOS operating system, cpm both flavors, 2 Tarbell controllers, 2 Icom Controllers - 5 inch drives, op-80a paper tape reader - working last time I used (about 15 years ago), TI-9900 16 bit comp - single board, Many original assembly

manuals and instructions, loads of software and even about 100 cassette tape pgm. Best offer on each. Robert Schroeck, 80-41 159 Street, Jamaica, NY 11432, (718) 591-1454 only between 5pm - 8pm EST please! Email: Bo1454@aol.com

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For Sale: Lear Siegler ADM-5 CRT terminal w/ docs, PERTEC 8" drives w/ docs, Shugart 8" drives w/ docs, S-100 chassis w/ pwr supply, GE TermiNet 300 printer terminal w/ docs (3), DEC 300/1200 modem w/ docs (2), S-100 cards (all in very good condition) - North Star disk controller MDC-A3, MDC-A4 (2), Canada CL2400 real time clock w/ docs, Cromemco D+7A I/O (2) w/ docs, Seals S8KMB memory (2) w/ docs, Dutronics 8KMB R1 A memory, WMC Inc. Mem-1 memory, Netronics "JAWS" 64K w/ docs, Seals 8K SC (2) w/ docs, CompuPro RAM 17, MITS 16 MCS Static (4), SD Systems, VersaFloppy II cont. w/ docs, SD Sales memory (2), DynaByte 32K memory w/ docs, PTCO 4KRA (2), Godbout Econoram 64K, MITS 16MCD (3) w/ docs, IMSAI S I/O, Vector Graphic Bit Streamer, MITS 88-C700C, IMSAI P I/O, Tarbell cassette, Polymorphic Video, Electronic Discount Sales ROM board, ARTEC 32K-100, assorted ICs (14+), WD21231B-00 chips (2), Solid State Music card & attac., IMSAI PIC-8, Vector S-100 plugboard kit (unopened), S-100 testing boards (4), S-100 extensions (2) w/ docs, assorted breadboards (1 box), Vector R681-2 bus slots (4), CPUs (Z-80, 8080, 8088, 8086, 8085 - 12+ total), Eprom programmer w/ eproms (16+), (other boards listed may also have docs). Paper Tape - FOCAL 1/24/76, Proc Tech software #1, Cromemco Z-80 monitor w/ docs. All reasonable offers accepted. Call David at (915) 822-2683 between 7pm - 9pm MST or Historical@aol.com

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TI Professional, LTERM LP57, two keyboards, color monitor, hard drive. \$150 or best offer. Shirley Allums, Amarillo, TX, (806) 374-8856

Monroe 326 Scientist, by CompuCorp. Monroe 392 data cassette with many programs on tape. Original color manuals, briefcase style carrying case and 75 shares of CompuCorp of Santa Monica, CA. Contact Dominic J. Verda Ph.D., Ph,D., 9815 North 96th Place, Scottsdale Ranch, Scottsdale, AZ 85258-4701.

SONY SMC-70, using CP/M operating system. Monitor not included. Best offer. Jim Mattison, McAllen, TX, ph. # (210) 682-5224, fax (210) 682-9957. E-mail: 74562.176@compuserve.com

APPLE J[GS and IMAGEWRITER II including 2 disk drives (3 1/2", and 5 1/4"), monitor, mouse, and keyboard. Never had trouble. \$350 - \$400. Andrew Moody, Canfield, Ohio. (216) 533-6706. E-mail: 74244.473@compuserve.com

Three Phillips Micom word processors, manuals and disks included, you pay shipping and they're yours. They're metal, they're heavy, and I want them out of my storage unit. Pilara 2000 word processor, plus manual. Z80 machine but NOT a CP/M computer. Again, you pay shipping and it's yours. WANTED!!! Boot disks, hard-disk formatting software, and manuals for Excelan Nutcrackers. These CP/M computers were used by Excelan field technicians with their LAN software before they switched to their LANalyzers (PCs with ported software, same purpose). David A.J. McGlone, (503) 688-3563, Email: d.mcglone@genie.geis.com

HP-86 with HPIB, GP-10, & Modem "Plug in Modules", as well as ROM and RAM "Plug in modules" (they plug into slots in the back of the housing). It houses a cartridge type tape drive (.150 inch) and also has an External 5 1/4" Floppy Drive. Software includes a word processor and a spread sheet. I used it to "customize" test equipment programming (HP as well as others) for specific applications during "Automated testing" of extremely specialized tape

recorders. George McBride, Fair Lawn, New Jersey, (201) 794-5927 (or 1-800 533-2836, Ext. 5927) between 9:00 and 5:00 weekdays. E-mail:

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I collect books: early (generally pre-1970) books and manuals on computation: digital or analog computers, adding machines, punched-card machines, slide rules, etc. Also related biographies and histories (technical and industrial) from any period. I have extras from my collection available for trade: books from the 1950s and 1960s, along with histories of IBM, Apple, CDC, DEC, etc. Please send your list of extras (with condition) with the topics/titles you're looking for. David B. Sarrazin, 305 Applebriar Ln, Marlborough, MA 01752. E-mail: sarrazin@pasta.enet.dec.com

Tektronix 4051 computer terminal with I/O accessories plug-in unit. BASIC resident to system. Memory size about 250K. Monitor built-in 12" (memory crt screen). Tape deck, with "DC-300-A" type cartridge (have about six). Keyboard: integral with programmable function keys. Serial: I/O and printer port. Lots of books and documents and stuff. Condition: excellent (shipping weight about 120 lbs). 6950 Intercept Junior (single board computer). Display: 8 digit readout. Keyboard: 12 key multi-function keypad. Power supply: 6volt dc, 4 "D' size batteries or external. Processor: IM6100CCPL, DEC used this chip in PDP-8 systems. Accessories as separate plug-in PCB's: Serial I/O, Additional RAM, with battery back-up, Output device PCB, w/ speaker, I/O display, etc., PROM PCB (2 each of these PCB's, Documentation: everything

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aschwabe@netcom.com

Sinclair ZX80 (not working, but I don't think that much is wrong with it). The ROM is definitely OK as I've tried it in the ZX81, which becomes a ZX80! Manual & PSU included. Sinclair ZX81 & 16k RAM pack - fully working. Manual & PSU included. Box of Spectrum software, about 50 cassettes. including many classics. Box of BBC model B software, about 30 cassettes, including many classics. VIC20 Super Expander and 8K RAM cartridges. None of the above are worth a great deal, and I just want someone to take them off my hands. Silly offers are welcome on any/all of the above! Large quantity of Sinclair related magazines too: Sinclair User, Sinclair Projects, Sinclair Programs, ZX Computing, Your Spectrum/Sinclair. I think all these start from the first issue, and are virtually complete sets for the period I bought them (5 years or so). Great historical value! Make me an offer, and they're yours. Two Research Machines 380Z computers that I am very desperate to get rid of. They have a Z80A CPU, run CP/M and are classic British machines - surely there must be a collector out there! Both machines have 56K ram, 2 x 5.25" D/S disc drives, a "high resolution" graphics card (320x192), parallel and serial ports & colour board. I also have a 14" microvitec CUB colour monitor and a 12" black and white monitor. Software includes CP/M, BASIC. text editor/word processor, assembler, and some educational programs. These machines are in England! David Miller, E-mail: dmiller@sasl.demon.co.uk

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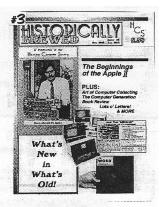
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- 5. Occupation
- 6. Place of Business
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Next issue: Get to know your fellow members!

TOYS "?" US Internal MEMO

June 14, 1994

Note: The following information is *strictly* confidential!!! Disclosure in any form, even the least hint as a joke is absolutely prohibited.

Subject: New Computer Product

A consortium between Apple, IBM and our company (to be further referred to in this memo as "The Company") will introduce a personal computer for children in November 1994. It is expected that over 200,000 units will be sold before Christmas 1994. For 1995, sales of over 2 million units are expected. The machine, called a **KidPC**, comes with 16 MB of RAM, a built-in hard disk of 300 MB and a PowerPC 603 CPU. It will have a keyboard, a touch pad, a built-in monitor, a built-in modem and no other external connections. It will not have a floppy drive because that would encourage software piracy. The only way to load new programs is through the internal, turbo 57,600 bps modem.

The **KidPC** comes with the operating system *KidOS/2* and several applications already

The **KidPC** comes with the operating system *KidOS/2* and several applications already installed. *KidOS/2* looks and feels like a simplified version of the Mac and IBM's OS. The applications include the drawing program *KidPix* (previously released for Mac and PC), the spreadsheet *KidCalc*, the word processor *KidType* and the communications program *KidTalk*. *KidBasic* is included as a programming language. Further, there are a few politically correct,

non-violent, non-addictive educational games.

The main objective of *KidOS/2* is political correctness and educational responsibility. 90% of the processing resources are devoted to that goal. 9% is devoted to the user interface and only 1% is devoted to useful functions. An enormous amount of artificial intelligence is built into the OS. Not only does it prevent you from typing the word
beep> or other obscenities, it also makes it practically impossible to display certain letters next to each other on the screen, whether you draw them in *KidPix*, you write a program to show them in *KidBasic* or start four different applications, each displaying letters to offend. *KidOS/2* continuously monitors all user activities, it signals signs of computer addiction, it analyses all texts the user reads or writes, it analyses shapes and colors the user draws or views, etc. No chance of ever seeing something remotely pornographic on the screen of a **KidPC**. All user activities are judged for educational value and political correctness. The user can perform calculations using *KidCalc* or *KidBasic*, but if the user performs too many homework-type calculations, the program will be aborted. *KidOS/2* computes the total amount of educational value a user enjoys. If that is not enough, playing of recreational games will be blocked until the user performs some educational exercises.

Through the built-in high-speed modem and the program *KidTalk*, the user can call a BBS. The communications protocol is proprietary and the **KidPC** can only talk to special *KidBBS*'es. The users can chat, exchange electronic mail, post messages and upload or download programs, texts and pictures. Needless to say everything on the BBS is severely screened, both by intelligent software and by humans. Sex, politics and religion are completely taboo. Therefore, there is absolutely no chance that the kids ever download real porn. Applications and games can also be downloaded from a *KidBBS*. These cost real money so the kids (or their parents) have to pay first. Once these programs are on the **KidPC**, they cannot be copied to other **KidPC**'s so software piracy is prevented. Upgrades to the OS are automatically downloaded each time a *KidBBS* is called. Such upgrades are sometimes necessary. Suppose that someday Fidel Castro is replaced by a democratic leader, then Cuba will be an ideal vacation country. Kids should then be able to write about it. The current version of *KidOS/2* prevents the

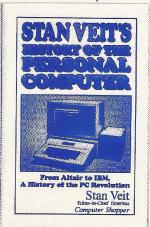
word Čuba from being entered or viewed in any way.

Each **KidPC** comes with a magnetic card and a pin code. These are packed separately and are for the parents. The parents can insert the card into a special slot and enter the pin code. Then the parents can customize several parameters of *KidOS/2*, such as the total time the system may be used each day, the minimum ratio between educational use and recreational use, their political preferences, etc. All within safe margins of course; the parents cannot configure *KidOS/2* such that it can be used all day for games only and that kids are allowed to write that Castro is great. Of course the use of the modem and various types of *KidBBS* usage can also be restricted by the parents. Finally the parents can see how often and for what purposes their kids used the **KidPC**. They also see exactly which naughty things the OS prevented from happening. Therefore the **KidPC** is an ideal educational tool and should become The Company's number one seller.

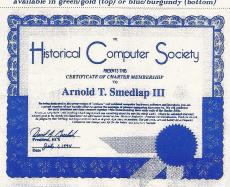
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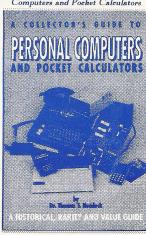


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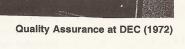
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FROM THE PUBLISHER

BACK IN THE SADDLE AGAIN! More trails to blaze.

By David A. Greelish, Publisher & Editor

ello again, this is David Greelish reporting live from the giant piles of computer hardware, disks, books and assorted "stuff" here at our new HCS headquarters. Our recent move was a big success, but there is much more work to be done. It was no easy haul across half of this great nation, but now our classic machines are basking in the warm sun and the cool breezes of Florida! That's right, please make note of our new address across the page.

Settling In

"Please, if you

haven't sent in

your information,

do so now (for

quickly jot down

your information

our database

a brief list of

and send it in

by November

22nd."

report). Just

Jacksonville, Florida is my home town and I haven't lived here in over four years. I believe it has more opportunity to offer the Society than El Paso, Texas. There is a fairly large science museum here and we have future plans to approach the staff with a proposal to display our collection. I also have plans to organize a local meeting of HCS once a month starting in January. There are also many computer and Ham fests held in Florida, we hope to participate in about four or five fests a year.

Our new office is located in the historic district of Jacksonville, an area called Riverside. Like the name, we are in close proximity of the St. John's River and the downtown area. It is really great to be back to the greenery and away from the stark desert of El Paso

A Change In Plans

You may or may not have noticed the lateness of your new issue of HB. We have fallen quite behind schedule. HB will be back on schedule regularly starting in January. Here are the completion dates of our next two issues:

Issue #8 - November 29th Issue #9 - January 5th

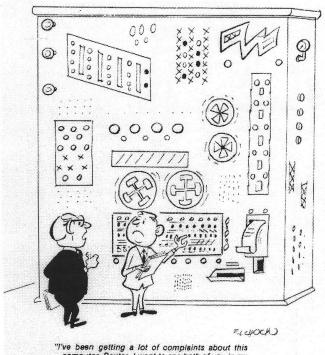
Some projects were completed with this issue and some were not. Our new cover was completed, but our membership database report was not. We only received about two dozen responses to the questionnaire from last issue. Please, if you haven't sent in your information, do so now. Just quickly jot down a brief list of your information and send it in by November 22nd. Next issue, we will definitely run a listing of all current members as of November 22nd, 1994. We will also print charts of our demographics such as members by state, monthly growth, age range, etc.

Much To Do

Please know: I am dedicated to the success and growth of HCS and HB now more than ever. Our settling-in period is over. It's time to

see HCS grow into a substantial organization and for HB to become the professional magazine I have always intended it to become. We have a new regular feature writer this issue and with issue #8 comes three more. The writing for HB has always been excellent and our new additions are no exception. I know that the burden of success for HB rests on my shoulders - make sure it is on time and well edited, and to begin again promoting it with ads, press releases and appearances. Your commitment to the cause is the last deciding factor. Thank you for believing in our cause and for your continued support.

Please enjoy another new addition to the pages of HB -COMICS! See you again in three weeks. Best, DG



"I've been getting a lot of complaints about this computer, Baxter, I want to see both of you in my

Historically Brewed is a bimonthly publication of the

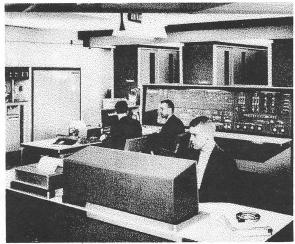
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A LARC Computer, 1965

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Are you a proud member of HCS? Prove it by showing off your copy of Historically Brewed! If you know someone interested in computer history, tell them about HB.

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> > - Staff -

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David A. Greelish

Contributors:

Douglas W. Jones Kevin Stumpf Erez Kaplan & Larry Groebe (for our great new masthead!)

- What's In your HB -

From the Publisher

HB Letters	2
DEC pdp-8	7
Cartoons	10
For The Collector	11
Calculating Machines	12
Our Friends	13
Trading Post	14
Business Card Ads	16

HB LETTERS

BE A PART, WRITE IN NOW!

Readers share their stories, collections and comments. Isn't it time **YOU** wrote in with your computing lore?!

THE CANON CAT

Hey there HCS and HB,

So I finally got your issue, read it, and enjoyed it! The Raskin piece did bring up some thoughts, though. You have to understand that Jef at times has espoused a kind of interface fascism that has gotten him in trouble. For example, the Mac had no cursor keys in order to force users to cope with the mouse, and the Cat had no cursor keys in order to force users to learn the operation of the leap key. While effective as a training system, this is pretty painful when you're actually trying to use the machine. Cursor keys came in with the Mac Plus, which was really the first Mac to be widely accepted by businesses. And after a long battle within Information Appliance, they were incorporated into the design of the Cat laptop (I saw it, by the way. It was a beautiful machine!). In both instances the lack of cursor keys had apparently slowed public acceptance, and I know there was a lot of public screaming

I still the cursor key thing was one of the major factors in the downfall of the Cat. A salesperson could not demo the Cat by showing that you could type, move around on the screen, and print. Moving around requires an explanation of the leap key, which is not easy, as you now know having tried to write about it (By my third or fourth Cat article I actually got good at it!). Take your average customer for a word processor or a typewriter and throw search / navigation concepts at him or her, and you've got problems.

Neither Canon nor Jef wanted the Cat to be positioned as a computer, no matter what anybody has said later. This always struck me as a little odd, because out of the other side of his mouth Jef was voicing hope that people would write Forth applications for the Cat, like spreadsheets and such.

In fairness to Canon, their philosophy was typical of many Japanese firms: put a product on the market, see if the public likes it, and only if there's good acceptance do you apply advertising dollars. At the time of the Cat, Canon had *no* presence in the computer market and no computer distribution channel. It was quite logical for them to sell through the office automation channel, where they were a big player due to the copiers. Admittedly, typewriter salespeople didn't know how to sell it, but I doubt ComputerLand employees would have done any better.

Take care!

Ezra Shapiro From the Internet

Send your computer history, information and ideas to:

NEW ADDRESS!

HB Letters 2962 Park Street #I Jacksonville, FL 32205

or e-mail us at:

Ezra,

Glad that you liked our mag and thank you for the "inside" insight. (Ezra was a contributing editor for *BYTE* and wrote the article "A Spiritual Heir to the Macintosh", *BYTE* magazine, October 1987, which reviewed the Canon Cat.) See issue #6. -DG

David,

I received issue #6 of Historically Brewed yesterday and enjoyed the various articles. Thanks for printing and editing the Canon Cat article.

Concerning the Cat paper, I am updating it to include some additional technical information. I am willing to make paper copies of this paper available to HCS members who want additional Cat information. This will include several comments by Jef Raskin, the Cat's creator, and a reference section listing detailed reading material. I would charge only for the photocopying (around 10 cents per page) and the postage (around a \$1). This paper should be around 15 pages long, so a total cost would be \$2.50. Could you please include the above paragraph in your HB letters section? Include also my mailing and e-mail addresses.

After reading HB I have some comments that I think may be of some benefit to HB that may make it a better journal:

- 1) Include some biographical info about the authors of HB articles. A short blurb about the person's occupation, computer interests, and address would seem sufficient.
- 2) Check the grammar and typing of the articles. For example, you seem to like to use "there" in place of "their." Also, you should use fancy quotes and not the vertical typewriter quotes.
- 3) Your new scanner seems to work great. The pictures in HB #6 were clear and readable. Let's see a lot more. Thanks.

David T. Craig 941 Calle Mejia #509 Santa Fe, NM 87501 71533.606@compuserve.com

Thanks David,

We did receive a lot of interest and positive response to your article. You should receive some orders for the extended paper. Your suggestions are all good ones and have been mentioned by a few other people as well. I will try to apply them and to continue the improvements with each new issue. -DG

FROM TEXAS

Hello

I read the article about you in the July 94 issue of *Texas Monthly*. I think what you're doing with old computers is fascinating. I agree: the 70s and 80s were a blur when it came to trying to keep up with personal computers. I am an elementary school librarian whose first experience with a computer was the old Commodore PET (BEFORE the 64s). I think the first one I saw had about 8K (I think my wristwatch that I wear now probably has more memory!)

I love history and it sounds as if you're performing a worthwhile service: preserving some history. Keep up the good work.

wadew@tenet.edu From the Internet

IEEE ANNALS

The Annals of the History of Computing will shortly publish Volume 16, Number 4 -- a special issue devoted to the history of programming languages. This issue was put together by special guest editor Tim Bergin of American University in Washington D.C.

In keeping with past practice, we publish the abstracts of the major articles here so you can get a taste of the good things to come. Remember that the Annals also includes several "Departments" which will keep you informed of any news in the field, biographies of the great figures, anecdotes, literature and book reviews, and (in this issue) the index for the full Volume 16.

Those of you who subscribe can watch the mail for it to arrive later in the year. Those of you who don't -- contact me for details of price and procedure -- you don't have to be a member of the IEEE in order to take advantage of the very low "sister society" rates. You may contact me directly at: williams@cpsc.ucagary.ca

Volume 16, Number 4 will contain:

THE ORIGINS OF COMPUTER PROGRAMMING by Brian Randell

This paper describes some of the early developments which can now be viewed as constituting steps towards the development of program control, and of the modern concept of a stored program. In particular, it discusses early automatic devices, Babbage's contributions set against a background of the technology of his day, the contributions of some of his direct successors, and the genesis of the stored-program idea.

THE EARLY HISTORY OF REXX by Mike Cowlishaw

REXX is a procedural language which has many novel features. Its goal was to make programming easier in the belief that getting the design right for people to use is more important than providing for easy implementation. REXX development depended on the use of electronic mail. As a result, and perhaps uniquely for a programming language, there exists an essentially complete historical record of the design process and discussions. This paper describes the early history of REXX, illustrated by quotations from the electronic mail record and from other contemporary documents.

COMPILING SIMULA: A HISTORICAL STUDY OF TECHNOLOGICAL GENESIS by Jan Rune Holmevik

This article traces the history of the programming language SIMULA from the 1950s into the 1970s, focusing in particular on the formative years between 1962 and 1967. It offers no technical appraisal of the language per se. Rather, it is a socio-technical analysis aimed at exploring the broader history of the SIMULA project. The article asserts that technological change should be studied in a contextual perspective and thus the politics surrounding the project as well as the pre-history of SIMULA are given ample attention.

A HISTORY OF DATA-FLOW LANGUAGES

by Paul G. Whiting and Robert S.V. Pascoe

Data-flow refers to both a languagelevel paradigm of computation and to a family of processor architectures based on this paradigm. This paper elaborates data-flow language issues and the evolution of data-flow languages. In considering limits to the expressive power of these languages, underlying architectural issues have, of necessity, been discussed. Although the paper attempts to present a complete history of data-flow languages, it concentrates on those languages which specifically belong to this class and have been implemented for a data-flow machine. In many cases, the distinction between issues of language semantics and machine architecture are unclear; usually we have found that this reflects the evolution of data-flow, and the close association between language and archi-

tecture development. In some sections of the

in the amount of detail presented when com-

paper, it may appear that there is an imbalance

pared to other sections. This imbalance is pro-

portional to the publications and the amount of

information readily available for the topic of

that section.

Abstracts of Articles Appearing in Vol. 16, No.3, IEEE Annals of the History of Computing:

Charles Babbage and the Assurance of Lives Martin Campbell-Kelly
Department of Computer Science
University of Warwick
Coventry CV4 7AL, UK
e-mail: mck@dcs.warwick.ac.uk

In 1824, Charles Babbage was appointed actuary of the Protector Life Assurance Society of London, which led him to prepare a new set of life tables and undertake a study of the life insurance industry. He subsequently wrote his well-known book the Assurance of Lives (1826). This article describes the role of Charles Babbage in the development of life insurance and the reform of life insurance industry, and the significance of the Assurance of Lives in his intellectual development.

The Number Factory: Punched-Card Machines at the Dutch Central Bureau of Statistics
Jan van den Ende
History of Technology Unit
Delft University of Technology
De Vries van Heystplantsoen 2
2628 RZ Delft, The Netherlands
e-mail: JvandenEnde@wtm.tudelft.nl

This article describes the application of punched-card machinery for data processing at the Dutch Central Bureau of Statistics (DCBS) between 1899 and the mid-1960s. It demonstrates that the increasing replacement of manual data processing by these machines was not stimulated primarily by their technical improvement, but by specific changes in the bureau's statistical program. Attention is paid to the influence of the labor market, organization of labor in data processing, and the establishment of a special data processing department, paving the way for the introduction of the digital computer. The development of the statistical program of the DCBS is related to its wider social context.

Locating the Victim: An Overview of Census-Taking, Tabulation Technology, and Persecution in Nazi Germany David Martin Luebke Social Sciences Division Bennington College Bennington, VT 05201-6001

Sybil Milton US Holocaust Museum 100 Raoul Wallenberg Place SW Washington, DC 20024-2150 e-mail: smilton@ushmm.org

Nazi persecution of racial victim groups presupposed not only precise legal definitions and close cooperation among multiple governmental agencies, but also sophisticated technical procedures for locating those groups according to complex age, occupational, and racial criteria. This article shows how a variety of administrative tools -- including two national censuses, a system of resident registration, and several special racial databases -- were used to locate groups eventually slated for deportation and death, as well as the possible role played in this process by Hollerith tabulation technology. Patterns in the expulsion of Jews from Germany suggest that aggregate census data may have been used to guide this process as well. The precise role played by punched-card tabulation technology remains a matter of speculation. However, it is certain that as early as 1933, Nazi officials and statisticians envisioned a future in which the racial characteristics and vital statistics of every resident would be monitored through tabulation technology in a system of comprehensive surveillance. While the "Final Solution" was in no sense caused by the availability of sophisticated census-taking and tabulation technologies, concrete evidence suggests that Hollerith machines rationalized the management of concentration camp labor, an important element in the Nazi program of "extermination through work."

The Origin of Computer Graphics within General Motors
Fred N. Krull
Trellis Software and Controls
2619 Product Drive, Suite 106
Rochester Hills, MI 48309
e-mail: fredkrull@aol.com.

This report traces the history of the development of computer graphics technology at the General Motors Research Laboratories during the period from 1958 to 1967. A concept demonstration was formulated in the late 1950s to show the feasibility of applying computer technology to the problem of vehicle body design. The narration then traces the history of a joint project between GM and IBM for development of new and unique computer graphics hardware. The salient features of the Design Augmented by Computer system (DAC-1) are summarized in terms of nine separate technologies that were brought together for the first time to form a complete computerbased design environment.

A number of people have asked for details about subscribing to the *Annals of the History of Computing*. To save time and effort, I decided to post my reply here...

The Annals is published 4 times per year (about 100 pages in an issue, but that

varies from issue to issue). It is the "journal of record" for the history of computation (mainly computer history but we publish material on calculation from the earliest times up to about 15 years ago). It is published by the IEEE Computer Society, but you don't have to be a member to subscribe. If you are a member of any of the IEEE societies then the cost is \$19.00 per year (\$20 if you are an IEEE member but not a member of any of the IEEE societies). If you belong to a "sister society" then the rates are \$42 for a year's subscription (still cheap when compared to a lot of journals). A "sister society" is almost anything with an interest in history or computing - ACM, BCS, CBI, HOCC, IEE, SHOT, etc. etc. Charge to libraries and others is \$110.

The easiest way to sign up (which will ensure that you get the special issue on programming languages) is to simply phone the order in and charge it to your VISA, Master Card, or Amex.

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Mike Williams
Assistant Editor-in-Chief

Remember everyone, if you contact the IEEE, please let them know that you found this information here in HB.
-DG

HISTORY FOR SALE?

I am interested in getting rid of a Lilith computer at minimum cost to me in time and money. Ideally, a couple of husky representatives of a computer museum would show up on my doorstep with a 17" Super VGA monitor. I would point out the closet where the Lilith currently resides and they would do the moving out the door and into their station wagon for transport to some other place. Current location - central Chicago. Please contact Gerry Haller at ghaller@mcs.com

This machine has a history and story:

In the late 70's, a group of computer scientists were working at Xerox PARC on computers of the future (one of them later designed the Lisa and the Macintosh). While most were hardware oriented, one, Niklaus Wirth (the creator of Pascal) was interested in computer languages while he was on a sabbatical from the ETH in Zurich. He was working on a language to "fix" the problems of Pascal (which he says was only designed to teach

computer programming) which he called Modula 2. While working on Modula 2 at PARC he had the idea for a software engineers workstation that would allow a software engineer to pursue his craft without ever picking up a pencil again. It would have a big screen (19" portrait) and would hardware execute Modula 2 code. This design was then engineered and built by Richard Oran, then an instructor at BYU in Provo, UT. The machine became known around the world as the Lilith (see Wagner or your Jewish mythology) and earned Dr. Oran a Ph.D. from the ETH. I have available one complete Lilith and two spare CRTs plus a complete set of spare parts. The machine had most of the software installed that was available in 1985. The machine was working when it was last turned off seven years ago. A complete set of engineering documentation is available from Dr. Oran for the cost of copying. There was a lot of software written for the Lilith at the ETH and is probably available from them for the asking (they might even put it on the Net). We are downsizing our lives and I no longer have room to store any of the above. If someone out there is a real Modula 2 fan, I'll even throw in my Niklaus Wirth autographed copy of Modula 2.

Best,

Gerry Haller ghaller@mcs.com

SIMPLE TOOLS

Dear HB,

I was glad to learn about your publication, and I think you're doing a great job. I especially liked the article about MITS in issue #6, since it gave some insight into early microcomputer history by someone who was actually there when it happened.

Back in issue #3 there was a short article about the Tandy TRS-80 Model 100. One thing that the writer did not mention was that this early notebook computer was wildly popular with journalists, and became virtually "standard equipment" for newspaper reporters who had to file stories from the field. Many sports reporters used these on press row at ballparks and arenas. Here in Kentucky, a few of the smaller daily newspapers still have only 300 baud modems on their newsroom minicomputer systems, seeing no compelling reason to upgrade because the only portable computers their reporters use are Tandy Model 100s. Yes, some of these are still in professional use in 1994!

Best regards,

Steve Baron Lexington, KY David,

I just got your magazine and read the article on MITS. I am just so stoked! You sent me two copies, just FYI, I'm going to pass the second on to a friend. Consider me a member! Send me any info you have, and I'll put it up on my site for free! Please reserve a copy of each back issue, I'll get \$\$ in the mail for them immediately. As soon as I get some more money, I'll subscribe, and order your books.

I'm now the proud owner of an Amiga 1000! My dad gave it to me when he upgraded to a 2000. As soon as my company gets off the ground, and my living quarters expand, I'm going to pick up his TI too. Have you done any articles on the TI? The Geneve (TI near compatible, running in 80 columns with 512 colors)?

Your editorial captured perfectly own feelings. And the first letter was great! My feelings too. I know someone with a PDP-8 with core memory, and 3 or 4 PDP-11s and a MicroVAX or two whose "job" is sysadmining a huge old VAX 780 for the local school.

Have you done any articles on old terminals? I'm just so excited to see your magazine! I also thought the following might interest those of your readers with access to the World Wide Web... it is the URL for an online, hyper-linked version of the PDP-1 Handbook, with pictures and lots of other neat stuff.

PDP 1 HANDBOOK

leavitt@deeptht
From the Internet

HB & David,

I was one of the winners in the Computer Museum's spring auction, and I was pleased to get your newsletter some time back. Congratulations on starting it; granted there aren't many people yet who find "antique" computers to be collectible, but no doubt the numbers are growing. And hey, for now, it keeps the prices down.

Even so, it's harder today to find old iron than it was just a few years ago. Two months ago I grabbed an Apple Lisa for \$10 at the local electronics flea market, but it's getting awfully hard to find pre-IBM-era machines. And old software is surprisingly hard to locate. Where are the VisiCalcs, the WordStars, the dBase IIs of yesteryear? Surely we didn't ALL write our own programs back then...

Anyway, now that I finally located your e-mail address buried in issue #5, I thought I would submit an addendum to your piece on Computer History Books. While I was pleased to find I had most of them from your list, a scan through my library revealed

over a dozen you didn't mention. Some of them are quite worth seeking out.

A second list could be started on historic books of computing, antiques like Isaac Asimov's guide to the slide rule(!)

And speaking of such, that would make an interesting article - an overview on collecting computer TOYS. There have been several dating back to the 50s -- Digicomp, Geniac, Thinkatron, the Motorific programmable cars, etc. Am I volunteering to write it? Not yet - not until I can get a Digicomp of my own once again. (I had one back in '68, my first "computer"). I would be willing to think about writing some piece or other, depending on your needs. Let me know. And keep up the good work!

Larry Groebe CompUSA

Hi Larry,

Thanks for the list of omitted books. I will be printing an updated book list in our next issue. It will contain your additions as well as from a few others. It's interesting that you brought up the idea of an article about the "toy" computers of the 50s and 60s. I am currently working on such an article and HCS will be acquiring an original BRAINIAC within a few weeks.

Thank you for all of your support and help with updating our QuarkXpress software and the new masthead for the cover. -DG

Hello,

We met at the amateur radio meeting here in El Paso recently.

I just wanted to tell you that I really did enjoy your presentation on computers and I think that I learned a lot about the workings of other computers. I had no idea that there were so many different kinds of computers other than Commodore, Apple, and IBM.

My first computer was a door stopper..err..a Commodore 64. I had this computer since I was five years old and it had never failed me once. I had blown chalk dust all over it, let it bake in the sun, you name it, I did just about everything to it. It never broke. I really am sorry to see Commodore go out of business. Makes me think of an old Aunt that I had known a long time ago. She finally passed away.

Hasta!

Daniel Quist El Paso, TX

COMPUTER CHUCKLES

From Software News, August 3, 1981

"COMPUTERS CONSUME HACKERS"

Psychologists have warned that computers have spawned a group of addicts, who often neglect nutrition, personal lives or anything interfering with their activities in front of a computer console, according to an article in Science Digest Magazine.

Particularly acute among college and high school-age youths, the computer addiction phenomenon is just another escape from social adjustment in many cases. "Everyone has problems socially to some degree, and the computer can act as just another escape mechanism," said Ralph Gorin, director of computer facilities at Stanford University. "The youngster (or 'hacker' as the addicts have been called) feels like 'I just can't stand it anymore' so he runs down to the computer room. The computer doesn't care what time it is or what you look like or what you may have been doing lately. The computer doesn't scold you or talk back," he continued. "I remember one hacker. We literally had to carry him off his chair to feed him and put him to sleep. We really feared for his health," an MIT computer science professor was quoted as saying.

Although the typical hackers are attempting to create the "ultimate program," they seldom make "desirable" programmers, Joseph Weizenbaum, author and also MIT Computer Science Professor, claimed in the article. The so-called "hacker" makes the program so complex and esoteric, others have difficulty understanding it, he said. Furthermore, the hacker rarely keeps records, Weizenbaum added.

"Computers are attractive because, to a higher degree than any other object, they are interesting and malleable," said Philip Zimbardo, a Stanford professor of psychology. Like people, they interact, and like people, they answer questions. However, they answer more questions and respond to them more accurately, the article pointed out.

"The youngsters can form as many subtle nuances and textured relationships with the computers as they can with people," said Sherry Turkle, a sociology professor at MIT. Computers are becoming more and more "our world," the article concludes, meaning these addicts are not just a freak phenomenon. "So perhaps hackers are, after all, harbingers of the world to come," the article concludes.

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THE DEC PDP-8 STORY

THE FIRST LINE OF TRULY SMALL COMPUTERS Part I - the beginning

By Douglas W. Jones, University of Iowa

n August 11, 1963, Digital Equipment Corporation unveiled a new machine at Wescon (the Western Computer Conference); this machine, the PDP-5 was the first of the family of machines that continued with the PDP-8 and ended with the demise of the DECmate III+ in 1990. This article is the first of a series of articles on these computers, covering the early history of the "Family of 8" computers and the dawn of the minicomputer revolution.

Today, the word minicomputer sounds a bit quaint, referring as it does to a breed of computer that has all but disappeared from the scene. Today, the world is dominated by microcomputers, personal workstations, file servers and supercomputers, and it is easy to forget the revolutionary impact of the minicomputer.

The Historical Setting

In 1960, the world of computing was dominated by giants, hulking great monsters of machines, costing millions of dollars, hidden away in air conditioned solitude, tended by white-coated technicians and isolated from their users behind security doors and layers of bureaucracy. Vacuum tubes were the dominant technology, and various companies were racing to bring the new generation of transistorized computers to market. IBM's experimental 704T, a transistorized version of their 704, was the machine to beat, but young aggressive companies like Digital Equipment Corporation and Control Data Corporation had their own transistorized machines on the market.

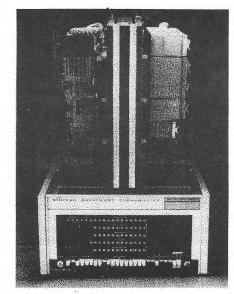
Digital Equipment Corporation, or DEC, was founded in 1957 with \$100,000 in capital, mostly provided by the venture capitalists at American Research and Development Corporation. Ken Olson and Harlan Anderson founded the company with the aim of producing transistorized computers, and they wanted to call it the Digital Computer Corporation. The people at ARDC, though, didn't like this name; they felt that the market for computers was too small, and urged the new company to concentrate on the market for transistorized digital logic modules.

Despite this pressure from their major stockholder, DEC developed a digital computer, but to avoid offending their stockholders, they didn't call it a computer, they called it a "Programmable Data Processor," the PDP-1. The first of these was delivered to BBN in early 1961, and DEC quoted a price of \$85,000 for a bare bones system. The PDP-1 was a moderate sized machine, with 18 bits per word, but even so, it undersold most of the other machines on the market by a wide margin. The PDP-4 was a modestly successful follow up, but while it was being developed, two other

groups came out with even smaller machines.

At CDC, one of Seymour Cray's first ventures was the design of the CDC 160, a transistorized computer with only 12 bits per word. The CDC 160 was packaged in a desk, a revolutionary idea at the time, with a front-panel display that looked like an expensive digital clock. The CDC 160 hit the market at about the same time as the DEC PDP-1, and within a few years, hundreds were sold, helping to pave the way for CDC's explosive growth into the world's leading producer of supercomputers, a position they held until Cray left CDC to form his own company.

While this was going on, Wesley Clark at Lincoln Labs and Mary Brazier, a neurophysiologist at MIT developed the idea that a small computer, equipped with analog to digital and digital to analog converters, would be the ideal laboratory tool for biomedical research. Like Cray, they chose a 12 bit word for their machine, which they named the LINC, or Laboratory Instrumentation Computer; they built this machine using logic modules purchased from Digital Equipment Corporation. The LINC was an immediate success, and as is common in the research community, the plans were made available to others. Over 24 LINC systems were built from these plans by various laboratories around the country before DEC recognized the market and began to sell machine in ready-made form.



An early pdp-8

In late 1964. DEC
began taking
orders for the
PDP-8. a new
machine that
was to replace
the PDP-5. At
\$18.500. this
machine cost
one third less
than the PDP-5
because of the
new technology
it used.

The DEC PDP-5

The early market success of the CDC 160 and the demonstrated market for LINC systems led DEC to develop a new machine, the PDP-5, unveiled in August 1963. The marketing campaign for the PDP-5 was aggressive - "Now, you can own the PDP-5 computer for what a core memory alone used to cost: \$27,000." Other computer companies didn't usually sell computers at the time, they leased them. DEC not only sold their machine, but they advertised a list price that was far less than the annual payments on most of the computers then on the market!

What made the PDP-5 so inexpensive? Nothing was included that wasn't absolutely essential. The word size was 12 bits, the minimum memory offered was 1024 words, and there wasn't even a subtract instruction! With most computers, a complete listing of the instruction set would be out of place in a historical overview such as this, but with the PDP-5, such a list is easy to provide:

OPCODE I Z ADDRESS

000 - AND - and operand with the accumulator
001 - TAD - add operand to the accumulator
010 - ISZ - increment and skip if result is zero
011 - DCA - deposit (store) and clear accumulator
100 - JMS - jump to subroutine
101 - JMP - jump

Each of the above instructions had, in addition to the 3 bit opcode, 7 bits of address, I, an indirect bit, and Z, a bit to indicate whether addressing was to page zero or to the current page as indicated by the program counter. Instruction 110, IOT, was reserved for input output operations, with 6 bits of device address and 3 bits to tell the device what to do.

110 DEVICE OPERATION

Instruction 111 was used for two groups of microcoded operations; the first of these had one bit assigned to each of the following operations:

1110 ABCDEFGH

- a) CLA clear the accumulator
- b) CLL clear the link (carry) bit
- c) CMA ones complement the accumulator
- d) CML complement the link bit
- e) RAR rotate accumulator and link one bit right
- f) RAL rotate accumulator and link one bit left
- g) *** double the shift count for RAR or RAL
- h) IAC increment the accumulator

These could be microcoded, so, for example, the instruction CMA IAC (7041 octal) did a two's complement, and the

constant - 2 could be loaded with the microcoded combination of CLA CLL CMA and RAL (7344). There was no mnemonic for the bit that doubled the shift-count; instead, the assembly language mnemonics RTR and RTL set both the appropriate rotate bit and the double bit.

The second group of microcoded instructions allowed a full assortment of conditional skip instructions, as well as some miscellaneous operations:

1111ABCDEFG0

a) CLA - clear the accumulator
b) SMA - skip on minus accumulator
c) SZA - skip on zero accumulator
d) SNL - skip on nonzero link (carry bit)
e) *** - invert the sense of the skip instruction
f) OSR - or switch register with accumulator
g) HLT - halt

These could also be microcoded, so, for example, SMA SZA CLA (7700 octal) would skip the next instruction if the accumulator was negative or zero and then clear the accumulator. There was no specific mnemonic for the skip-invert bit; instead, the assembly language mnemonics SPA, SNA and SZL would set both the appropriate skip bit as well as the invert bit.

Within a year of its introduction, 34 PDP-5 systems had been delivered, and another 28 more were on order; at the time, this was a respectable start for a new machine, and it was sufficient to justify expending the effort to design a follow up machine. DEC sales literature lists the following PDP-5 applications, at a time when about 75 machines had been delivered:

Research Experiments and Measurement
Pulse-height analysis
Time-of-flight and bubble-chamber measurements
General physics investigation

Quality Control Testing and Statistical Analysis
Tensile-strength testing
Electronic component testing
Analog to and digital circuit module testing
Computer peripheral equipment testing

Data Acquisition, Reduction and Analysis
Oceanographic research
Biomedical research
Telemetry
Real-time analog signal monitoring

Process Control

Steel mill control
Typesetting
Chemical and Petroleum industry process control
Nuclear Reactor monitor and control

Data Processing
Open shop computing
Hybrid processing
Media conversion

Communications

Multi-user time-shared computing

Message switching systems

Data collection and processing

Education
Engineering
Programming fundamentals
Colleges, high schools, industrial training

Despite DEC's announcement of the PDP-8, new orders for PDP-5 systems continued to come in until 1967; this is

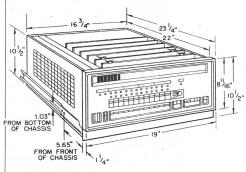


Figure 11-2 Rack-Mounted PDP-8/E Dimensions

probably because customers with one machine wanted more machines that were fully compatible with what they already had. By the end of the production run, a total of 116 PDP-5 systems had been installed.

The DEC PDP-8

In late 1964, DEC began taking orders for the PDP-8, a new machine that was to replace the PDP-5. At \$18,500, this machine cost one third less than the PDP-5 because of the new technology it used. Among these innovations were the use of a new line of circuit boards designed for mass production, and semi-automatically wire-wrapped backplanes. Another technology DEC introduced with the PDP-8 was the Flip Chip (tm) very small scale hybrid integrated circuit. Flip-chips were networks of 5 or so diodes and resistors, mounted on a ceramic substrate. This was essentially a dead-end technology, but it allowed DEC to sell the PDP-8 as an integrated circuit computer. From the start, DEC also used the term Flip Chip to refer to their line of logic modules, and this usage persisted into the 1970's.

In addition to a price advantage, the PDP-8's use of new technology reduced the power consumption of the machine to 780

watts - less than many hair dryers! The new technology also allowed the size of the machine to be reduced to the point where a table-top model could be offered, but at 250 pounds, the table needed to be fairly strong.

In the case of the PDP-5, a number of shortcuts were taken to reduce the price at the expense of performance. The worst of these was the use of memory location zero as the program counter. Such measures were not needed in the PDP-8, and in fact, the PDP-8 was fairly fast, for its time, with most instructions limited by the core memory cycle time of 1.5 microseconds. The PDP-8 had a minimum of 4K words of core memory, and, with an optional memory management unit, it could be expanded to 32K words. Memory expansion required a considerable amount of rack mounting space; the 7 upgrade modules needed for the full 32K filled all of one 6 foot high mounting rack and part of another.

The PDP-8 was a wildly successful machine. The first 9 PDP-8 systems were delivered in July, 1965, and by December, 75 systems had been delivered and over 300 more were on order. Within another year, the 400th PDP-8 had been delivered, and almost 300 more machines were on order. The chief rival in the marketplace, the CDC 160, was left in the dust, and other competitors were scrambling to introduce their own small computers.

The PDP-8 was eventually displaced from the market by a newer model, the PDP-8/I, based on TTL integrated circuit technology. This machine was introduced in 1968, but the original model remained in limited production until 1970, by which time 1440 machines had been sold. Many of these survive to this day in operating condition.

Peripherals

Even in 1965, Small computers demanded small peripherals. While large computer centers were content to use massive and noisy line printers for text output, PDP-8 systems were usually sold with just an ASR 33 Teletype. The paper-tape reader and punch on the side of the ASR 33 was sufficient for small scale off-line storage, and in fact, many PDP-8 systems lived long productive careers with no other input-output devices. If a user needed higher capacity input-output than a Teletype could provide, DEC offered a high speed paper tape reader and punch, a conventional big line-printer, and interfaces to standard IBM punched card equipment. When equipped with such peripherals and expanded to the full 32,768 word capacity of the memory management unit, a PDP-8 looked suspiciously like a large mainframe computer system.

Wesley Clark, in developing the LINC, had realized that users needed a

compact and reliable way to store data and programs. To meet this need, he had devised a new magnetic tape recording format, the LINCtape. This used 4 inch reels of 3/4 inch wide tape, with a highly redundant recording format that eliminated the need for most of the conventional warnings about careful tape handling. Linctapes could be carelessly stuffed in a jacket pocket or dropped on the floor with little fear that such treatment would damage them.

The data format used on LINCtape was block addressable, so that any block on the tape could be read or written without disturbing adjacent blocks. It is fair to say that the LINCtape was designed to meet most of the same specifications as were later met by floppy disks.

DEC took the idea of LINCtape and improved slightly on the data format, calling the result DECtape; this came close to being the perfect small magnetic tape format for a small computer, and as a result, the stereotypical modest sized PDP-8 system was one with two DECtape drives and a teletype. DECtape continued in use on most DEC computers well into the 1970's, both for off-line storage and data interchange.

Noting the success of the LINC and the CDC 160 in laboratory applications, DEC offered a full line of laboratory peripherals for the PDP-8, including analog to digital converters, computer controlled analog multiplexors, digital to analog converters and oscilloscope displays.

The PDP-8 was an open-architecture machine from the start; the maintenance manuals that came with one contained many of the engineering drawings for the machine, and they gave all the details necessary for users wishing to build their own peripheral interfaces. This was ideal for a machine that was used for laboratory instrumentation and industrial automation, and when you find a PDP-8 system today, chances are, you'll find a few homebrew peripherals.

Spinoffs

DEC sold many PDP-8 systems directly to end-users, but they quickly discovered the OEM, or Original Equipment Maker market, and began selling machines customized to the needs of specific OEMs. Frequently, this customization was minimal, for example, the Foxboro corporation, which used PDP-8 systems in the industrial automation products they sold, had them relabeled PCP-8. Another early OEM customer was Hewlett Packard, until they came out with their own line of minicomputers. DEC also began to package PDP-8 systems for specific applications; for example, the Typeset-8 system was a bundled hardware-software system that was widely sold to large newspapers and publishing houses. In effect, these were text editing and formatting systems, with rough-draft output on the computer's line printer, and final-draft output in the form of a paper-tape to control a typesetting machine.

Another standard package was the Display-8, or Type 338 buffered display. This consisted of a PDP-8 with attached CRT display and light pen; although this could be used as a stand-alone system, it was typically sold as a "smart terminal" for use with a large mainframe such as a PDP-6 or PDP-10. Much of the early interactive computer graphics work done at MIT in the 1960's used these display systems.

Finally, there was the LINC-8, a complete PDP-8 combined with most of a LINC in one package. This machine had two operating modes, LINC mode and PDP-8 mode, and it was a very successful laboratory machine, with convenient I/O support for lab peripherals provided by the LINC combined with the general purpose programming environment of the PDP-8. 142 of these systems were built, some of which survive to this day.

In the Next Issue

The classic PDP-8 was such a success that many other companies began to produce their own minicomputers. The next installment in this series will focus on the competition and on how DEC reacted to maintain its lead in the minicomputer marketplace.

Next month's story will cover the development of the PDP-8 family from the PDP-8/S, the first computer sold on a retail, cash and carry basis, to the PDP-8/E, introduced in 1970 and considered by many to be the definitive model of the PDP-8.

Sources

I have based my sales figures on a series of monthly "Computer Census" reports published by the journal *Computers and Automation* through the 1960's. The same journal also published many DEC press releases, as did *Communications of the ACM*. Another major source I have used is my collection of DEC handbooks, maintenance manuals, and sales literature.

Finally, I have relied on personal recollections of many long-time DEC users, including Bernard Weiss, who built one of the first 12 LINC systems, Charles Lasner, the owner of many PDP-8 systems and the keeper of a huge amount of DEC lore, and many others, many of whom populate USENET's alt.sys.pdp8 newsgroup.



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FOR THE COLLECTOR

A REGULAR SERIES FOR THE ENTHUSIAST New Feature

By Kevin Stumpf, Unusual Systems

f you're reading this column, you must have been bitten by the computer bug. Not the kind of computer bug that annoys hardware and software developers, but the bug that makes you enjoy owning, buying, selling, trading, reading about, swapping stories about, and talking about old computers.

"To each their own," the saying goes. Some people collect paintings, others automobiles, and of course there's the venerable stamp, coin, and sports card collectors. Lately, collecting phone cards has become fashionable. Why, some people even collect lunch boxes. Isn't that sill . . interesting!

Yes, you caught me. I can't conceive of the thought of collecting lunch boxes and it shows. I'm not attracted to them - I don't even use one, but I want to respect those who do. Remember, "to each their own." Gosh, just think what some lunch box collectors might think of computer collectors. I've personally experienced this form of prejudice. Acquaintances and good friends alike thought I was less than intact when I told them I collect computers. I endured all sorts of amusing comments (funny though, I never found them amusing) and was told repeatedly how silly my hobby was. Even though I was happy doing my thing, I felt isolated nobody understood.

As of today, there is a forum for computer collectors. We computer collectors have an information exchange. We are not alone. This column will be in each issue of HB. In it we'll discuss topics of mutual interest. We'll cover the range of collectibles (i.e. why just collect computers and ignore all the other interesting memorabilia?), the psychology of collecting, pricing, sourcing, insuring your collection, storing your artifacts, and many other practical issues. We'll also cover the personal side of this fascinating field. For instance, tell me how you started collecting computers, what are some unusual uses you have or have seen for old computers, and of course we want to hear about "the big one that got away." We'll educate, encourage, and entertain each other.

Before we go any farther, we owe it to ourselves to resolve an important issue. I think it's important to agree on how old "old" is. Just what does the word "old" mean to computer collectors? I really like the slogan our editor, David Greelish, created for this publication. David calls old computers the "youngest antiques around." In my book, Domestic Commercial Computing Power Between 1950 & 1979, I wrote about "computers that recently became very old." Although these phrases might be called cute they're not precise and we need precision.

Let's examine the word antique and see if that will help us draw a conclusion. The 1990 edition of the Concise Oxford Dictionary defines an antique as "an object of considerable age." Age is measurable - ah ha, now we're onto something. So if we subtract the date a certain computer was released into the marketplace from today's date we'll know how old it is. Next we can compare this age to the age of the industry and poof, we'll know if it's old or not. Right? It can't be that easy, but let's give it a try. Let's use 1950 as the year general purpose computing began, thus the industry is 44 years of age. Using this scheme, an Epson QX-10 (circa 1985), isn't old yet. We can with authority declare QX-10's are still young computers! Wait, a QX-10 is not just a computer, its a microcomputer. Does that make a difference?

The word "computer" has become a generic term. When a person says "I work with computers" they aren't saying much. We need to know what types of systems (mainframe, etc.), hardware or software, support or development, and on and on. In the same sense, calculating the age of a computer from a single date is meaningless since there are so many different types, not just kinds, of computers. So, the answer to our last question is yes, categorizing computers does make a difference.

Comparing an Apple II (circa 1977) to a Data Machines 620 (circa 1966) is unfair. Its a blatant example of an apples to oranges comparison. What we need to recognize is that there are old mainframes and new mainframes, there are old minicomputers and older minicomputers, and there are old microcomputers and new microcomputers - the age of a computer is relative. I will draw no conclusions. A collector who has a mint condition IMSAI 8080 can be as proud as the collector who has a working HP 2116A. Likewise, the role a certain computer played in the industry's or a technology's development is independent of age. One thing I do know for sure is that the computer industry is big enough to satisfy every collectors' interests, no matter how old a particular computer is.

I need your comments, ideas, and stories. Please keep the flow of information going in two directions. Look for information about Unusual Systems in the "Friends of HCS" feature; look for more information about my book in our ad and feel free to contact me by e-mail at: unusual@kstumpf.waterloordp.on.ca.

The word "computer" has become a generic term. When a person says "I work with computers" they aren't saying much. We need to know what types of systems (mainframe, etc.), hardware or software, support or development, and on and on.

THE CALCULATING MACHINE

A CLOSER LOOK FROM ONE ENTHUSIAST

From Beads to Gears

By Erez Kaplan

have always loved the combination of the old and the mechanical. I am fascinated by old mechanical machines such as Gramophones, Sewing Machines, Clocks and so on. One day in June 1991 during one of my visits to a flea market, I saw an interesting machine which caught my eye. It was the size of a shoe box, made of metal, heavy, and had numbers and levers all over it. Unable to resist the urge, I bought it. After careful examination, I came to the conclusion that this machine had something to do with calculating.

This really amazed me. As a kid who grew up in the 1960's I never saw such a device, and it stunned me to think how familiar we all are with the electrical devices surrounding us today. The idea that calculation could be carried out by a piece of metal with many parts fascinated me. Today, three years later, I have a collection of 150 such items. The majority are NON ELECTRICAL calculating machines and several Abacuses and slide rules. I spend a large amount of time researching this area and since there are very few current publications on the subject, the task is even more challenging. I also spend a lot of time restoring the machines. Most of them just need dusting and oiling, but often some mechanical adjustments are needed too.

A History of Calculating

The History of Calculating is rich in its content and can be inspected from many different angles. In this article I will attempt to give a short and informative description of some of the milestones in this history. We will only examine the non-electrical devices which were related to modern computing. I have omitted the chapter about Charles Babbage, as this is well described in many current books and deserves an article by itself.

The Abacus

The name, Abacus, derives from the Latin word ABAX meaning table or board covered with dust. The origins of the Abacus are buried deep in the history of mankind. It is known that in it's "modern" form, it appeared in China in the 13th century AD. The Chinese Abacus is made of 13 columns with 2 beads on top (heaven) and 5 beads bellow (earth). The Japanese copied the Chinese Abacus around the 17th century AD and adapted it to their more delicate way of thinking. It has 21 columns with 1 bead on top (heaven) and 4 beads bellow (earth). The Abacus is still taught in the Far East as a part of regular school training and is used commonly in many places. In 1946, a contest between a Japanese Abacist (Kiyoshu Matzukai) and an Electronic computer was held for 2 days resulting in an unmistakable victory of the Abacist. The third modern conversion of the Abacus is the Russian model with 10 beads in 10 arched rows.

Logarithms

John Napier, 1550 - 1617. Napier played a key role in the history of computing. Besides being a clergyman and philosopher, he was a gifted mathematician and in 1614 (not long before his death) he published his great work of logarithms in the book called Rabdologia. This was a remarkable invention since it enabled a person to transform multiplication and division (which were very complicated tasks at the time) into simple addition and subtraction. His logarithm tables soon became wide spread and were used by many people. Funnily enough, Napier is often remembered more by another invention of his nicknamed "Napier's Bones." This invention was a small instrument constructed of 10 rods, on which were engraved with the multiplication table. This simple device allowed people to perform multiplication in a fast manner provided one of the numbers was of only one digit (i.e. 6 X 6742).

The Slide Rule

The first Slide Rule appeared in 1650 and was the result of a joined effort by two Englishmen, Edmund Gunter and the Reverend William Oughtred. The slide rule was based on Napier's logarithms and become the first analog computer (of the modern ages) since the act of multiplication and subtraction were solved by physical distance. This invention was dormant until 1850 when a French artillery officer named Amedee Amnnheim added the movable double-sided cursor, which gave it it's appearance as we know it today.

The Calculating Machine

The glory goes to a Frenchman named Blaise Pascal who in 1642 invented the calculating machine at the age of 21. Pascal who was a gifted lad from childhood, wanted to spend more time with his father, a tax collector. Since his dad was always busy at home adding together columns of numbers, Blaise decided to invent a machine which would free his father from this tedious task. He made a large machine (20' x 4' x 3') out of metal which included 8 dials manipulated by a stylus. Today, there are about 50 surviving machines manufactured by Blaise Pascal. Most of them can be seen in some of the larger science museums.

There were two other prior attempts to create such a machine which were only discovered "recently." One is by Wilhelm Schickard who invented a mechanical calculator in 1623. Apparently only two prototypes were built and their location is unknown (if they sur-

The History of Calculating is rich in its content and can be inspected from many different angles." There were hundreds of manufacturers who produced an amazing variety of calculating machines up until the late 1960s."

vived at all). Only in the 1950's when letters of Schickard were discovered was this information revealed. From diagrams in these letters, it is possible to reconstruct one of his machines. An exhibition to celebrate the 400th anniversary of Wilhelm Schickard's birth (1592 - 1635) was held in Herrenberg, a small town in the southwest portion of Germany in May 1993.

An even earlier attempt was made by none other than Leonardo da Vinci. In 1967, some of his notes were found which included descriptions of a machine bearing a certain resemblance to Pascal's in the National Museum of Spain. A model of da Vinci's machine was made with the help of these notes.

By the 1820's there were about 25 manufacturers of calculating machines. Most of them were the work of one man, few of them worked correctly, and even less actually reached the manufacturing line. The first calculating machine to be produced in large numbers was invented by a Frenchman, Thomas de Colmar in 1820. His machine, which was based on a "stepped drum" mechanism and had many clones, was still produced as late as 1920. It was called the "Arithmometer."

The next "generation" of calculating machines came from a Swedish inventor named Willgodt T. Odhner. His machine incorporated a "pinwheel" mechanism. This mechanism was highly successful and soon took over the popularity of the Arithmometer. There were dozens of companies which incorporated the Odhner mechanism. In fact, I have a Russian machine named "Felix" which was manufactured in 1972 looking much like the Odhner machine from 1905!

There were hundreds of manufacturers who produced an amazing variety of calculating machines up until the late 1960's. Only then did they surrender gracefully to the appearance of the electric calculating machines and later to the electronic computer.

About the Author:

Erez Kaplan is 35, married and has two children. He works as a Software Engineer at Scitex Corporation. He would be glad to answer any of your questions, receive your comments, get new information or just chat about this article or related subjects. You can reach him at:

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The Analytical Engine, A 48+ page quarterly newsletter of our fellowship group, the Computer History Association of California. Published by CHAC, Kip Crosby, Executive Director, CHAC (Internet: cpu@chac.win.net) 3375 Alma #263, Palo Alto, CA 94306-3501, CHAC is an organization somewhat similar to HCS, though somewhat different. Many of the members talk on the Internet in the alt.folklore.computers newsgroup. CHAC is concerned primarily with computers which originated in California or played a substantial role there during their life cycle. CHAC is planning a museum as soon as possible and they have a fast growing and well balanced collection of computers. Membership is \$35 a year.

The Computer Journal. A 48+ page bimonthly journal/newsletter which is the foremost text on today's CP/M (and now also PC/XT) user. Published by Bill D. Kibler, The Computer Journal, P.O. Box 535, Lincoln, CA 95648-0535. (916) 645-1670. TCJ is \$24 a year.

The Z-Letter, A 20+ page bimonthly newsletter supporting Z-System and CP/M users. Published by David A.J. McGlone, Lambda Software Publishing, 149 West Hilliard Lane, Eugene, OR 97404-3057, (503) 688-3563. The Z-Letter is an excellent resource for serious CP/Mers. It usually has a mixture of history and technical information on a variety of systems, though mostly concentrating on late 1970's and early 1980's CP/M machines. \$18/12 issues.

The STAUNCH 8/89'er, A 24 page newsletter dedicated to the H-8/89 user. Not in publication at this time, but Kirk L. Thompson, Editor, P.O. Box 548, West Branch, IA 52358, (319) 643-7136, has numerous copies of 30+ back issues which he can supply. \$3 an issue.

the world of 68"micros, A 30+ page newsletter printed 8 times a year which supports mostly CoCo's and other 68xx & 68x0x platforms. The journal is published by F. G. Swygert, FARNA Systems, P.O. Box 321, Warner Robins, GA 31099-0321 (Internet: dsrt@Delphi.com). Another fine and professionally published magazine. An invaluable technical resource for the 68' micro user. \$23 a year.

The International Calculator Collector, An 8+ page quarterly newsletter of the International Association of Calculator Collectors. Published by Guy Ball & Bruce Flamm, Co-Editors, Wilson/Barnett Publishing, IACC, 14561 Livingston Street, Tustin, CA 92680. A fast growing organization and a nice little newsletter with some very interesting information about calculator history, classifieds and discussion.

QL Hacker's Journal, A mini 12+ page newsletter dedicated to Sinclair programming and hacking. Published by Tim Swenson, 5615 Botkins Road, Huber Heights, OH 45424. Write him for more info.

Elliam Associates, P.O. Box 2664, Atascadero, CA 93423, (805) 466-8440. Sells public domain and commercial CP/M software for most CP/M based platforms. They also specialize in the Amstrad PCW. Elliam has tons of CP/M software offered in two packed catalogs. See business card ad.

FARNA Systems, Box 321, Warner Robins, GA 31099-0321, (912) 328-7859. Offering CoCo and OS-9 software, publications and support. See business card ad-

Lambda Software Publishing, 149 West Hilliard Lane, Eugene, OR 97404-3057, (503) 688-3563. A licensed dealer of CP/M 2.2 and manuals, plus a large collection of CP/M boot disks for many machines. CP/M related software manuals, fonts, word processing and spread sheets. Dealer of Z-System and *Micro Cornucopia* reprints. Disk copying.

Adam's House, Route 2, Box 2756, 1829-1 County Road 130, Pearland, TX 77581-9503, (713) 482-5040. Offering a huge assortment of hardware, software, peripherals and service for your Adam computer. Excellent catalog available.

Commercial Computing Museum Project, Kevin Stumpf, (519) 744-2900, E-mail: unusual@kstumpf.waterloordp.on.ca. A project dedicated to the acquisition and preservation of artifacts and memorabilia from the commercial use of electronic, digital computers. Please call or write for more information.

THE BREWED Trading Post

Your source for hard-to-find "classic" computers, software, literature and peripherals - \$7

DIGICOMP Toy Computer wanted. Call - Larry (214) 520-1245, E-mail: LGROEBE@aol.com

Two DEC PDP-11/40's and related gear, a total of five DEC racks plus much unmounted stuff. Most of it, including the processors, is thought to be in operating condition but has not been used for several years. Also numerous technical manuals, schematics, etc. Make offer, I can help load, but you haul. Perry Hutchison, Tigard, OR (suburb of Portland), (503) 639-9520 or E-mail: perryh@pluto.rain.com

Atari 800 & Disk Drive -- Complete, everything works, quite a bit of software, including assembler editor cartridge, Star Raiders, and others -- Asking \$100, negotiable. E-mail for full list of accessories: hayesjw@eng.auburn.edu

Digital WT/78 (VT78-WA) Word terminal (predecessor to DecMate) w/2 double 8" drive units (RX01 and RX02?), no software, almost mint condition. \$35 OBO. Curtis Wilbar Jr., Attleboro, MA, 508-442-1228 E-mail: curtis wilbar@east.sun.com

Mac 512Ke, internal 800k drive, external 2nd 800k drive, keyboard, mouse, ImageWriter I Printer, great condition, little use, orig. manuals, software (word processors, games, more) all cables. \$325 complete system, OBO. Possibly will split system and printer. No reasonable offer refused! Must Sell--really need the cash! Gregory Zenon, 5 Fairfield Street, Amherst, MA 01002, (413) 549.2712 or E-mail:

gwzenon@ucsvax.ucs.umass.edu

One dozen Wang dedicated wordprocessors for sale on a make offer, you pay shipping basis, as is. The wordprocessors have three basic instruction books, one written tutorial, & one floppy tutorial. They also have one floppy disk drive, model 2275-10 115vac 6hz 2A "M". They are the same size & weight as current desktop models & would cost the same to ship. The Wang mainframe harddrive is model 0385-2 115vac 60hz - sorry, I have no idea how many meg. The two mainframe terminals are model 2236-DE 115vac 2.5A 60hz. The two modems are model 2.200 mvp-12 115vac 60hz 230w. There is a switch board like unit that ties the whole mainframe setup together, it is model vs-65 115vac / 8.0A & 230vac / 4.0A 50/60hz. There are also three Wang printers. This mainframe has washing machine sized units & would take a truck to move around & would cost to ship. MAKE OFFER! As is, you pay

shipping. Bruce E. McClure, E-mail: mcclureb@spot.colorado.edu

Epson circa 1983 or 84 with CP/M operating system and 2 floppy drives. (No hard drive.) Peachtree software for word processing, mailing list and spreadsheet. Also, a Brother daisy wheel printer. Very swank for its time. In original packing boxes (although used for about five years). Also have a Hayes modem around somewhere that we used to use with it. If you're interested, make us an offer. Norma A. Pierce, Richmond VA. E-mail: npierce@cabell.vcu.edu

MORROW CPM SYSTEM, 64K RAM, double 200K floppies, daisy wheel printer, AND LOTS OF SOFTWARE AND MANUALS. Will trade for MAC or NOVELL hardware, software, or manuals. Anthony Olszewski, BBS: 201-963-8007 or voice: 201-792-7988, 16 Hoboken Ave, Jersey City, N.1 07303. E-mail:

aolsz@ritz.mordor.com

Amiga A1000 that a collector may be interested in. It is s/n 17, and it is the unit Commodore sent to UL for acceptance (it has stickers on it regarding this). I believe it has the ram expansion board, but the plastic cover that would fit over it is missing. I have heard from one person that this may be because they had not decided on the logo yet (amiga or the check mark) to put on that piece. If you know anybody looking for a real piece of amiga history, this may be for them. I am looking for \$500 out of it. I can be reached by phone at (607) 277-2937 -Matthew or E-mail:

matthew@alchemy.geo.cornell.edu

TWO DEC VAX 11/725 minicom-puters (One works, one is for parts) \$200 VAX 11/730 CPU (KA730), Dual TU58 cassette tape drives, RC25 disk (1 fixed platter + 1 removable), 2 MBytes memory, Installed Options: FP730 Floating Point, DMF32 communications interface, DEUNA Ethernet interface, Includes software: VAX/VMS v4.6, DECnet-VAX V4.6, VAX Pascal V3.7-254, VAX C V2.3-024 (no manuals), VAX Fortran V4.8-276, 20/20 (spreadsheet software), VAX 725/730 Complete Diagnostics system, All VMS & 11/725 manuals, including 11/725 schematics, DEC LA34 with tractor-feed (console printer). This is the smallest member of the VAX (not MicroVax) family of minicomputers which included 11/730, 11/750, 11/780, etc. The system cabinet measures 44.5cm X 62.2cm X 72.4cm (17.5" W x 24.5" H x 28.5" D) and weighs 93.2 kg (205 lbs). This computer is suitable to a home or office environment and does not have demanding power or cooling requirements. Patrick Engholm, Palatine (Chicago area) Illinois, (708) 776-7434. E-mail:

patrick_engholm@wes.mot.com

TANDY TRS 80 Model 102 Portable "Laptop" Computer. This is the 3rd model manufactored of the original TRS 80. It has 32k Ram and a spreadsheet on a ROM chip. Comes with a Tandy portable printer, a cassette tape drive and lots of original software. It has Basic, word processor, calender and address book programs loaded. Excellent working condition. All for \$225 plus shipping. Jim Dixon, 632 Walnut Ave SW, Roanoke, VA 24016, (703) 345-6707, E-mail: iim_n_noke@aol.com

PDP 11/150 Computer, standard 64K memory, excellent condition except that one of the 8" drives needs a new belt (easily corrected - I might be able to take care of this if asked). Bunch of 8" floppies included, including RT-11 operating system, original hardware & software documentation. \$75 FOB. Bruce Campbell, Hypatia Inc., 15270 SW Holly Hill Road, Hillsboro, OR 97123-9074. All Telecom (Auto-discriminate): 503-628-2936 (Pacific) E-mail: hypatiainc@aol.com

Mac 512k chassis with a "monster-Mac" upgrade (made by Supermac, 2 meg ram, upgraded ROM-as of 1985, 800k drive, SCSI port). Includes Apple+ mouse. Works extremely well. \$200 obo. Doug Keiller, 1433 Brockton Ave. #5, LA, CA 90025, 310.312.5330, E-mail: DougSK@aol.com

Sinclair ZX80 made in England with manual and power supply. It is a white creamy color. I also have schemetics for it. Asking \$40. Ji Ma, 3757 15th Ave NE, Apt# 10, Seattle, WA 98105

KAYPRO 1, CP/M machine. 64K RAM. 2 DS/DD half-height floppy drives. Serial & parallel ports. Blue & gray case. Graphics capability. Built-in 9" monochrome screen (very readable). Detachable keyboard. Clean & in excellent working condition. The "1" came after the II/IV, 2/4 series. Includes system, word processing, and communications disks. No manuals. I have 3 of these systems. (I also have a Kaypro 2 and a Kaypro 4 for sale in excellent condition.) \$100 (US) plus shipping for each unit. Jim Shimabukuro, 2022 Algaroba Street #4, Honolulu, HI, 96826, (808) 949-0696, Internet:

JamesS@UHunix.UHcc.Hawaii.edu

IMSAI 8080A (S-100)-\$1000.00 Firm. In absolutely immaculate condition. NEVER used. The ideal museum piece. Also, unused Tarbell cassette interface and unused Cherry keyboard. All lights and switches work. 407-352-4469

Apple MACINTOSH (128k) Original Model M0001. Shrink- wrapped keyboard. Original electronics. Clean inside-out. \$500, Mark Williams, 407-352-4469, E-mail:

markw@hpcss01.cup.hp.com

Used slide rules, modest selection of mostly K+E, Post, and Picketts, some older, some newer (metal, no plastic). Send E-mail if you are interested in purchasing one (prices run around \$20 retail). I also buy slide rules, but am limiting that to the unusual types or lengths, and no plastic. Don Maslin, E-mail: donm@crash.cts.com

Polymorphic system 8813 with 3 drives, and the 16k ram option! Best Offer. E-mail: sjs007@acad.drake.edu

KIM I 6502 based single board computer. SYM I 6502 based computer mounted in metal case with power supply. TIMEX/SINCLAIR basic computer with 16k ram, Timex printer (thermal), Atari 800XL, Atari modem, Atari disk drive. Lots of early edition BYTE, Kilobaud, SYNC magazines plus lots of books for the KIM and SYM. Best offers. Arthur Bentley, 10252 South 2375 East, Sandy, Utah 84092, 801-943-0278, E-mail: alb@slc.unisys.com

Atari 5200 - \$40+S&H. Jeremy Kassis, 4140 N. Meadow Ridge Cir., Twin Falls, ID 83301, (208) 734-2564, E-mail: Jkassis3@aol.com

I have 5 or 6 TRS-80 expansion cards. One I think is a RAM card. Another may be a serial card? Best offers. Howard Swan III, 4409 Gen. Maloney, El Paso, TX 79924, E-mail: MrSpock787@aol.com

Commodore PET 2001, I have one that is perfect for a collector. Make offer. Bruce Nguyen, (206) 522-6126 Seattle, WA, E-mail: Nguyeb@aol.com

Now a funny, but true ad! -DG

-----> Hey Kids! <-----

Be the first/last/only one on your block to own your very own, fully functional, BALLY PROFESSIONAL ASTROCADE! The Astrocade comes with all original documentation (even registration card)!

Bally Astrocade comes complete with power supply, TV connections, and 2 hand controllers. Each controller has a paddle, joystick, and trig-

ger - All on one control! Amaze your friends! Also included with your Bally Astrocade are 4 built-in games/programs:

Gunfight - "A very popular arcade game," "Your gunfighter will be able to hide between cacti, trees, and even a covered wagon." Oooh!

Checkmate - "Cause your opponent to crash into your trail." This game is for 0-4 players! "The Professional Arcade [even] plays by itself.[!]"

Scribbling - "... a fascinating, creative game. By manipulating the various controls you can create a multicolor pattern on your TV screen and draw almost anything you choose."

Amazing! Think of the beautiful images you could create in the privacy of your own home, on your own TV! Scribbling also includes a handy keypad overlay, at NO extra charge!

Calculator - "Not only does your Bally Professional Arcade contain three great games, but it also has a 5-function, 10-memory, printing calculator that will store and scroll up to 92 entries on your television screen." Isn't technology wonderful!

And if that wasn't enough, the following cartridges (with original manuals) are included:

The Incredible Wizard - Similar to the arcade game of Wizard of Wor. Guide your wizard through the danger filled maze.

Football - "Eight offensive play options....", "Up to 4 players"

Space Fortress - "You command a lonely outpost far away in the galaxy.", "You'll find Space Fortress positively addicting. It always keeps your interest because of the increasing speed of the enemy assault from all sides." "Up to 4 players."

Tornado - Baseball / Tennis / Handball / Hockey - "Four major sports games in one cartridge give you a super value! Extraordinary computer simulations of all the action. In Baseball, you have full control of the speed and curve of the pitch."

Galactic Invasion - "Alien ships come at your missile launcher from every direction. They peel off from their formation singly or in groups of twos or threes. The more aliens you destroy, the more of their reinforcements attack. Realistic sounds add to the intensity! Up to 4 players." "Someday soon you may decide that you would like to have a computer in your home that will make your life a

whole lot easier. Well, you have got a good start on having one with owning a Bally Professional Arcade." If you act now, the Bally BASIC cartridge and accessories will be included! Now you can have that personal computer you've always wanted!

"There's no easier way to learn about computers than with the Bally BASIC system. The plug-in cartridge with built-in audio tape interface converts your ARCADE into a personal computer you can program yourself! The complete [included] self-teaching instruction book will help you learn programming while you create computer games, electronic music, and video art." This cartridge will magically transform the Bally Astrocade into a fully functional computer with a powerful Z-80 microprocessor for it's brain. Now you can take advantage of the powerful 160x88 pixel, 26 character x 11 line display with 256 colors, and the 1 channel sound, to create complex computer programs that can simplify and add pleasure to your life!

Also, included on the BASIC cartridge is a built-in cassette interface that "will allow you to save any program in the computer's [4K] memory on cassette tape and to input the program from tape to memory in less than 20 seconds.[!]" This is not to be confused with the older, bulkier, external, Bally Basic cassette interface released in 1978 that operated at 300 baud, NO way, this is the newer, faster unit that zips along at an amazing speed of 2000 baud!

All cartridges store easily in the built-in storage rack on your Bally Astro-cade! A smoked plastic cartridge cover ensures that your cartridges will remain dust free and in working order for years to come!

As this is a working classic system (circa 1979-1981) with original documentation, I would like to get at least \$100.00 + shipping for it, but don't let that stop you from making any offer. My wife is making me clean my junk (as she puts it) out of our basement and it has to go. Any reasonable offer will be considered.

If you would like to be the proud owner of this system, and the price is right, contact me via e-mail or by phone at the number/address below:

Greg Bennett, 801-280-0321, E-mail: gbennett@friendly.sim.es.com

COMPUTER HISTORY COLLECTION FOR SALE:

Books from 1950-1993

Magazines including:

Fred Gruenberger's Computing News: 1953–1958
Berkeley's Computers & Automation: 1952–1968

Byte: 1976-1989 Kilobaud: 1977-1980

ACM Publications: Journal: 1956-1975 60 issues

Communications: 1958–1980 236 issues Computing Reviews: 1962–1980 117 issues

UNIVAC and IBM Publications

Computer Hardware including: WW II Sperry T-1-A analog bombsight computer made by GM's AC Spark Plug division 1973 National Radio Institute Model 832 Digital Computer 1977 Intel Prompt 48 serial # CH 198 IMSAI PCS-80/15 serial # 1369

Toys including: 1959 Brainiac & Calculo Computer kits by Science Material Center

Please send long self addressed envelope with 52 cents postage to: Randy Liebermann, 2874 South Abingdon St., Apt. A1, Arlington, VA 22206-1363 Tel: 703-824-9733

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HCS Trading Post Classifieds -

Classified ads are accepted by mail only. All ads must be prepaid. Deadline for issue #8 is November 22nd!

AD RATES - Subscribers: First 10 words FREE (with 5 words or less in bold). Each additional word is .20¢ up to 150 words. Additional words over 160 (10 free + 150 words) are .30¢ each. Add .10¢ for each additional bold word. Non-Subscribers: .30¢ per word up to 150 words. The first 5 words or less may be in bold at no additional charge.

Additional words over 150 are .40¢ each. Add .10¢ for each additional bold word.

Counting Words - Your name and address count as 4 words, regardless of length. A phone number or E-mail address count as 2 words. A single letter (a, I) will not count as a word. A full name or company name, and address is required for all ads.

Example - IMSAI 8080, 64K RAM, P I/O board, Z-80A cpu, dual Pertec 8" disk drives, CRT terminal, loads of software, manuals and Homebrew newsletters. Best offer over \$5000, Joe Smoe, 111 East Blahh Road, Pepperville, ND 27634, Call (323) 876-5432 or E-mail: BadZits@insane.asylum.edu This ad = 37 words - 10 = 27 x .20¢ = \$5.40 (for a sub-

scriber).

Statement - The publisher reserves the right to edit or reject an ad for any reason if it is deemed inappropriate to the nature of this publication.

As a service to our readers - If you do not have E-mail access and wish to respond to an ad, Call me at (904) 384-7163 between 7pm - 9pm EST, and I will e-mail for you. -DG

- Historically Brewed Ad Cards -

"Business Card" ads are available in HB for only \$15 per issue. Please summit ads for issue #8 before November 22, 1994. Send to: HCS Classifieds - 2962 Park Street #1 - Jacksonville, FL 32205

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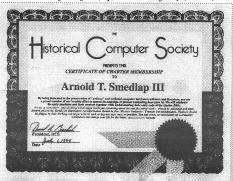
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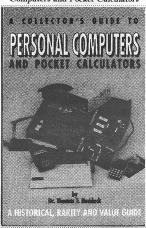


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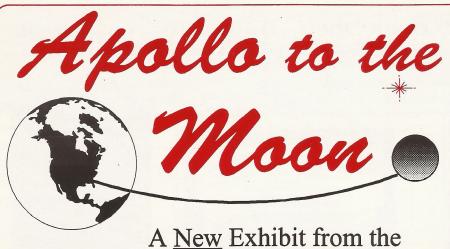
POSTAGE: Add \$3.00 for 1 book or \$5.00 for both - Quick U.S. Priority Mail NEW! HCS bumper stickers - send \$1 & 29¢ stamp

The Historical Computer Society's Membership Database Questionaire

Please take a few moments and answer these questions on a separate piece of paper and send it right away to the HCS office. We will print detailed information from this survey in the next issue.

- 1. Your name
- 2. Address
- 3. Phone
- 4. Age
- 5. Occupation
- 6. Place of Business
- 7. Computers you own (start with your modern machine and include 3 or 4 of your favorites)
 - 8. Other computer equipment?
 - 9. Other user group memberships?
 - 10. E-mail address
 - 11. Any comments or suggestions for HCS?
 - 12. Is it OK to print your address, e-mail address or phone?

Next issue: Get to know your fellow members!



American Computer Museum

The world renowned American Computer Museum is celebrating the 25th anniversary of the Apollo missions to the Moon. Trace over 4,000 years of navigation and computing technologies that led to the first man on the moon. You will see hundreds of historical computing devices from the abacus, early mechanical, electrical and electronic calculators and computers through today's microchip. Original Apollo mission hardware from the Smithsonian is on display including a watch worn on the Moon, lunar tools, an Apollo command module guidance computer, autographed Apollo astronaut memorabilia and displays on space spin-offs. Where were you on July 20th, 1969? If you remember the day - you'll never forget the place! Relive your memories or share them with your family at this ideal family destination! Experience this unique computer history museum as seen in the New Yorker Magazine, the New York Times, PC Week, QST Magazine, etc...

Downtown Bozeman, Montana

(Approx. 90 Miles North of Yellowstone National Park)

The American Computer Museum

234 East Babcock Street, Bozeman, MT 59771 Tel: (406) 587-7545, Fax: (406) 587-9620

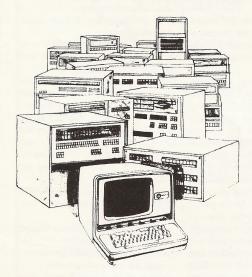
Hours: <u>September - May</u>: 12 Noon - 4:00 pm, Tuesdays, Wednesdays, Fridays & Saturdays (Closed Major Holidays)

<u>June, July & August:</u> Open 7 Days a week, 10:00 am - 4:00 pm (Closed July 4th) Fees: Adults, \$2.00 each, Children 6-12: \$1.00 each, special group rates are available.

SINCE 1993 - WHAT'S NEW IN WHAT'S OLD!

Tesue #8

• The Enthusiast's Magazine of Computer History Nostalgia •



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FROM THE PUBLISHER

1995 - THE NEW TRANSITION!

In with the in . . and in with the out?

By David A. Greelish, Publisher & Editor

anuary marked the 20th anniversary of the first commercially successful microcomputer - the Altair! We are now entering the third decade of personal computing. Things sure have changed drastically over the last twenty years! But, the industry has mostly evolved in a smooth pattern with just a few notable shake-ups. The first major shake-up was the introduction of the consumer computers and the relative end of hobbyist "brewed" machines. This happened near the end of 1977 and throughout 1978. The second major shake-up came with the introduction of the IBM PC in 1981; by 1983, DOS and IBM-compatibles had absorbed a huge chunk of the market and set the new "standard". As a dedicated Mac user, I want to say that the introduction of Macintosh in 1984 or even the Lisa's intro in 1983 was the next big dramatic change, but, since "Mac OS" today only accounts for less than 20% of the world's computers, the real change came with Microsoft Windows 3.0 in late 1990. What will be the next wave in computing? Well, it seems that the Internet and the World Wide Web have already answered that question. The next big step takes us back to Star Trek and my article from Issue #1; we will soon lose GUI's and mouse's, etc., it is almost time to begin talking to your machines!

THE HISTORY AND HOBBY

Not only am I an amateur computer historian, but I am also a computer collector. Actually, I'm a *Collector of Technological Antiques*, with a specialty in classic computers. Is that stretching it a bit?

Old mechanical objects have always fascinated me. Old record players (got one), old fans(want one), old stoves (want one), and etc. I also like antique electronics like radios(got two of those) and old TVs(want one). They're all really interesting!

AN UPDATE FROM HCS

Editor's note: The following is reprinted for the benefit of anyone who did not receive the original letter by way of e-mail or post.

Dear fellow members, friends and enthusiasts, I am writing to tell you that the Historical Computer Society and Historically Brewed are still alive! We have not disappeared forever. We are about to resurface with the long lost, and eagerly sought after issue #8 of HB. I am very sorry for the lateness of issue #8 and for leaving you all in the dark for so long. In the past, I have been late with other issues of HB, but never this long. I have experienced many personal difficulties and challenges over the last few months and my life aside from HCS has become extremely busy with the simple task of earning a living to support my family (if only I could run HCS full-time). I would also like to announce the birth of our new son, Andrew David on March 20th.

To get to the point; I find that I am unable to further handle the entire operation of HCS - now more than ever. It is very important to me. . but I have let it slip. There almost seemed to be no light at the end of the tunnel, but the good news is -HCS has added two new additions to it's management. I would like to announce to you - Kevin Stumpf, HCS' new Associate Editor and Walter Peterson, HCS' new Technical Director. Together (with your help too!) we plan to get HCS and HB back on track. There is still much interest; I receive loads of letters and e-mail, and we have a readership of over 300. You all have been very understanding and I know that we all want HCS to succeed. I have discovered that the hardest thing to recognize when managing a project - is when to realize that you can not do everything yourself, and when to delegate responsibility and authority to others. I've learned some valuable lessons.

Here are a few other announcements:

- Issue #8 is now out, whether at its best or not. Work on issue #9 will commence immediately.
- Issue #9 will contain an exclusive interview with Ed Roberts, the creator of the MITS Altair and "Father" of the PC revolution. We let January slip by without even mentioning the 20th anniversary of the personal computer the Jan. 1975 issue of Popular Electronics announcing the Altair to the world!
- Walter Peterson has plans to create a place for HCS on the Internet very soon! Stay tuned.
- As Associate Editor, Kevin Stumpf will be taking responsibility for answering overdue correspondence, e-mail and article coordination.
- Please allow us another week or so to get caught up on orders. If we still owe you a back issue, book or anything - then write and remind me.
- Help spread the word about the Historical Computer Society! Show HB to your local college library, computer club and computer stores.
- Please send your stories and photos of computers!! We need a regular photo page.

Computer History is inspiring and dynamic. I have never regretted what I started, nor have I ever wanted to quit. I have just been overwhelmed. Please accept my sincerest apologies. Thank you for all of your support and confidence!

Kind Regards,

David A. Greelish President & Founder, HCS (please note a small change of address)

Issue #9 is now tentatively scheduled for completion by May 15th. Take Care! -DG

What will be the next wave in computing? Well. it seems that the Internet and the World Wide Web have already answered that question. The next big step takes us back to Star Trek and my article from Issue #1."

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"A LOOK BACK" - . . about 10 years ago.



Leading Edge's new Personal Computer is built around the 8088, operating at a fast 7.16 MHz, and comes with 128K of RAM, an RS-232C serial port, and seven IBM PC-compatible expansion slots. Its features include a time-of-day clock with battery backup; IBM-format detached keyboard;51/4" double-sided, double-density disk drives with 320K capacity per drive; and TTL high-resolution 12" green video monitor capable of displaying up to 80 columns by 25 lines. Software bundled with the system at no extra cost consists of Microsoft DOS 1.25; Microsoft GW Basic; and Leading Edge Word Processing. \$2,895.00

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in computer history, tell them about HB.

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Douglas W. Jones Larry Anderson & Larry Groebe (for our great new masthead!)

- What's In your HB -

From the Publisher

HB Letters	2
Cartoons	5
DEC pdp-8	7
Our Friends	10
For The Collector	11
Intro to Classic Computing	12
Home Arcade Enthusiast	14
Business Card Ads	16

HB LETTERS

BE A PART, WRITE IN NOW!

Readers share their stories, collections and comments. Isn't it time **YOU** wrote in with your computing lore?!

HISTORICAL STUFF..

Editor, Historically Brewed

In 1977, Bally brought out the "ARCADE" game unit. The long-time slot machine / pinball machine manufacturer had gotten into electronic pinball machines, and their design team came up with a home game concept. The ARCADE was attached to a TV and came with three games in ROM, plus a four-function calculator. Additional games could be played by inserting a cassette-sized cartridge into a slot in the unit. Reading Greg Bennett's ad on pages 14 and 15 of issue #7 will give a good idea of the game capabilities. The processor, a Z-80, was used

The "twist" that Bally designers had put into their box was the accessibility of the Z-80 by the user. To do this, they made a cartridge that contained a Dr. L. Wang's version of Palo Alto Tiny Basic, which meant the user could program the machine, creating his own games or whatever. A cassette tape connection was made for program storage outside the machine.

Seeing the potential need for information about the unit, I started a newsletter for users, *The Arcadian*. The monthly publication reached over 2000 dedicated subscribers with a mix of programs, inner secrets of the machine, and news / reviews of factory and third-party software / hardware.

Yours truly,

Robert Fabris San Jose, CA

Robert,

Thanks for the great insight to what seems to have been a truly great little computer. There were other, similar game systems and obscure game systems / computers which also utilized good design, but apparently, bad marketing. The Coleco Adam comes to mind; it was indeed a good idea, but badly executed and marketed (see issue #2, HB book). Others include the Imagination Machine, Mattel's Aquarius and Atari's Super Pong. We would all indeed like to hear more about *The Arcadian*. Please write some more about it and perhaps send a sample or two. -DG

CALCULATING MACHINES

Dear Historically Brewed,

I read with interest Erez Kaplan's short article on *The Calculating Machine* in issue #7, and noticed the picture of the 1890 adding machine by Arithmometer on

that issue's cover. As the Burroughs Project Archivist at the Charles Babbage Institute, I work with many materials that cover the early adding and calculating machines of the burroughs Corporation, formerly the Burroughs Adding Machine Company and before that the American Arithmometer Company.

From its incorporation as the American Arithmometer Company in 1886 to its merger with Sperry Corporation in 1986 to form Unisys, Burroughs had a quite successful history. As it turns out, these 100 years can be roughly divided into two periods. For approximately the first fifty years, Burroughs was the foremost manufacturer of adding and calculating machines in the United States. Along with many other companies, Burroughs was one of the largest of the "Seven Dwarfs".

William S. Burroughs was a bank clerk in Auburn, NY when he decided, for health reasons, to move to St. Louis in 1882. It was here, in a small area of the Boyer machine Company shop, that Burroughs perfected his adding machine, specifically to help relieve bank clerks of the drudgery of figuring by hand the bank accounts of the day. Burroughs' original patent application was dated 1885, and was finally approved in 1888. American Arithmometer was incorporated in January of 1886 to sell Burroughs' machine, the first machine became known as Model #1.

The numbering and identification of these early Burroughs machines was rather haphazard at first. Every machine had its own unique serial number (along with its designation as model #1, model #2, etc.), but it wasn't until 1895 that a more rigid system of naming and grouping these machines was used. The "model #" was replaced by a style #, and different versions of a style became known as models. The serial numbers fell into certain style categories. Yet things weren't too complicated yet, because up until 1903 Burroughs made only four different styles of calculating machines. There were certain variations and special orders, of course, but in 1903, Burroughs made four basic styles.

By 1911, there were enough different types of burroughs machines that term "Class" came into use to describe several series that were related by function. Finally, by 1914 a system of consecutive numbering was introduced, whereby one could determine the year a machine was made and what class it was in by simply knowing the serial number. For example, a machine with a serial number of 487740 was a class 3 machine manufactured in 1919.

Many of the questions we get at the Charles Babbage Institute regarding the Burroughs Corporation Records concern the date of specific adding machines. The list of machines serial numbers we use (and assume

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NEW ADDRESSI

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or e-mail us at: historical@aol.com

are correct) has been extremely helpful. Perhaps your readers would also be interested in this kind of information. A sample of this identification chart for Burroughs machines follows. The number under a class is the lowest numbered machine for that class in that year.

For information about the Charles Babbage Institute (the Center for the History of Information Processing), our programs and archival holdings, or for additional information about Burroughs products and computers, feel free to contact:

Susan A. Stepka, Burroughs Project Archivist Charles Babbage Institute University of Minnesota 103 Walter Library; 117 Pleasant St. SE Minneapolis, MN 55455 (612) 624-5050 Fax: (612) 625-8054 E-mail: s-step@vm1.spcs.unm.edu

Sincerely,

Susan A. Stepka

Susan,

We have quite a few readers who are interested in mechanical calculators, and I know that they, as well as Erez and myself, really enjoyed the information that you have shared. I enjoy the newsletter and urge others to write you for more information. -DG

Dear Editor,

My previous letter mentioned the trouble I had getting historical information and software on the pdp-8. Then I got the sample copy and *** there it was ***. The first part of a series on the pdp-8! Years ago I took a motorcycle across Canada and back across the U.S. and stopped at the Computer Museum in Boston. I purchased a book there called Computer Engineering that included a section on the "8". You have revived my interest in DEC and I am rereading it. It is surprising at how far DEC seems to have fallen. Your issue #7 contains advertisements for DEC computers at close to scrap metal prices, with one in the "you haul it" category. Knowing that there is still active interest in DEC and the pdp-8 makes me feel much better.

I notice that communication with your magazine, contributors and advertisers relies heavily on E-mail. I cannot afford membership in a commercial service and am not sure of which one(s) you are using. I would like to contact pdp-8 users, but do not know how to go about it. Any help would be appreciated.

Yours,

Frank Wilson Tomales, CA

Frank,

Thanks for the kind words and for your support. Doug Jones' series on the pdp-8 is excellent and has really given me the bug to find one of these awesome classics for our collection. These machines were the inspiration for the Altair and S-100 computers. Doug would be an excellent person for you to write to:

Douglas Jones 816 Park Road Iowa City, IA 52246 E-mail: jones@cs.uiowa.edu

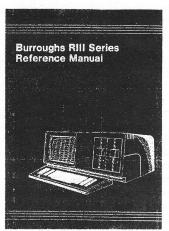
HCS uses America On-Line with access to the Internet. I highly recommend AOL for beginners. We hope to have a cheaper direct internet account in the near future. One of the best ways to meet other people who share your interests is in what is called a Usenet newsgroup. This is just a discussion group, and the one for pdp-8 enthusiasts is called alt.sys.pdp8 and for general computer history enthusiasts alt.folklore.computers.

MOST OBSCURE?

Editor,

Just got my first issue; I like it. Here's a feature idea: Most Obscure Microcomputer. Obviously ther're scads of likely contestants; one would have to establish some total obscurity condition – i.e., three of them once manufactured in the back of nowhere don't qualify. I mean, I have a Dynabyte multiuser (MP/M) Z80/8086 system downstairs that I think I've seen a single reference to elsewhere, but it was a commercial system that many businesses probably wasted their money on, including an acquaintance . . .

Well, my submission, in horror of your "Merger Mania" article about Unisys nee Burroughs, is the Burroughs RIII, which as far as I know - not much to be sure - is the closest Burroughs ever got to a microcomputer (I mean, aside from boring relabeling which they probably do now). I attach a photocopy of the cover of the manual I've still got; no unit unfortunately. I did however design an IBMstandard disk interface for the unit - so it could read avant-garde CP/M diskettes - when I worked for Burroughs a short time here on Long Island before that division went under. The unit was originally manufactured by a company called Redactorn(?), I believe, which Burroughs bought and pretty much systematically destroyed in the grand tradition. There



Burroughs RIII Reference manual

were amazing old Redactorn machines lurking around the huge empty building when I was there; one had a keyboard that'd make an electronic imitation of a typewriter "thunk" when you pressed the keys, supposedly so the poor frightened secretaries would feel more comfortable . . . Ah! Those were the days . . .

Sincerely,

J. G. Owen South Huntington, NY

You should definitely hang onto your Dynabyte, I have found some dual-processing systems to be quite rare. My first impression of the RIII is to say that it looks a lot like a Lisa, but I really think it looks more like the model II, TRS-80. Your Most Obscure Microcomputer feature is a great idea. I invite everyone to participate and to send in an entry. What's the most obscure computer that you know of? -DG

CLASSIC 8-BITS

Dear Mr. Greelish,

Thank you so very much for the sample issue of HB. The HCS is exactly everything I expected it to be, if not more! I'm delighted to learn that my eccentric hobby is shared by others, that I am not the only "oldschool hacker" out there. I primarily use Apple [plus computers, and was quite thrilled to see the history of the Apple][in your magazine. I am planning on mentioning the HCS to my Apple][user group; one of them has already decided to subscribe. I am also getting into TRS-80's, and plan on using my IBM PC Portable (the suitcase-sized luggable with the amber CRT) once I figure out what's blown on it's motherboard. My interest goes far beyond that though; I have almost a dozen "home computers" such as two CoCo's and an Atari 800XL. I have also found a Commodore C-16 - I never knew those existed! - And would

like to know more about these machines. Thanks again for the terrific job. Keep it going!

Aaron Heiss Brookfield, CT

Aaron,

The C-16 is an interesting and mysterious Commodore. We have one and it basically looks like a black Vic-20. Ours only has the C-16 Tutor cartridge and that's it. I'm not even sure if it's compatible with the Vic-20 or C64. It has been in storage since we moved to Florida and I haven't tried the cartridge on our SX-64. Released in 1984 (after the C64) the C-16 came from CBM with only a small owners guide. It was not supported and it failed as a learning computer. -DG

GOOD REVIEWS

David.

Thanks to a great review in Fact-sheet Five, here I am with the dollars for a sub, sight unseen. It sounds great and makes me think I might not be so crazy after all for wanting my brother's ancient Apple][with mono monitor and noisy floppy drives. I can't wait to see Historically Brewed in my mailbox.

Thanks.

David Graw Collierville, TN

David

Thanks for the enthusiasm and sorry you had to wait so long to get HB into your hands. For anyone who doesn't know what Factsheet Five is, it is a 'zine listing thousands of 'zines. For a huge sample issue, send \$6 to: P. O. Box 170099, San Francisco, CA 94117. -DG

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RELICS CLUB

Atari, Coleco, Intellevision,
Odyssey, Vectrex . . . do any of these names
bring back sweet memories? Are you still
interested in these systems or just having
"Video Game Nostalgia"? If you answered yes
to any of these questions, the following may be
of interest to you.

RELICS is an all new club that I am starting. I have already got a number of members on the Prodigy service, and am now hoping to expand out on the Internet. RELICS deals only with pre-NES systems (but including SMS and Atari 16 bit system) and their games. RELICS is a nation-wide and hopefully soon a world-wide club that is unlike any other that I have seen. RELICS will have its own fanzine entitled RELICS that I put out. Yes, arrangements have been made for the prodiction of a fanzine devoted to our club. Inside would be articles on the systems, games, gaming memories, free classifieds, and a trader's point.

The RELICS fanzine will be published quarterly. A free issue will be sent out to anyone who wants to become a registered member of the RELICS club. If you wish to become a registered member of RELICS, please E-mail your mailing address for a free issue of *RELICS*. If you wish to become a member, just fill out the enclosed form with a \$4.00 membership fee. The \$4.00 fee covers the printing and mailing costs of the RELICS fanzine. That's only a dollar an issue! If you would like to join or have any further questions, E-mail me at: mikec@in.net

Please enter: FWD Jeremy Cline RELICS as subject line.

AN ATARI MEMORY

Subject: How Atari Computers Changed Our Lives From: mstatz@cei.net (Mark Statzer)
>>Joe Walsh, ransom22@delphi.com says:
>>The Subject Heading above may look like the title to a cheap "B" movie, but it is actually a prelude to a discussion I hope to have with all who care to participate on the ways in which Atari computers have changed our lives. You may wonder why I tend to post messages like this one. Quite simply, it is

because I find it infinitely interesting to read messages from my fellow Atari Classic users who love their computers as much as I love mine. Another reason is that I have been a SysOp for a long time, so attempting to start conversations is a habit I can't break. Joe:) <<

I started off with Atari Computers in August, 1982, when I started working for a department store in Evansville, Indiana (Lazarus, one of those mirrors & neon joints) and worked in the camera dept, where they sold Atari - they had an 800, a 400, an 825 printer (roll newsprint paper - where do you ever see *that* anymore?) and a single 810 disk drive - with the cardboard insert still in it. I started playing with it (straight out of high school - My HS computer class had a single TRS-80 Model 1 and I was the proud owner of a Sinclair ZX-81) and started buying Creative Computing, and Antic, and Analog and started selling the little buggers hand over first!

People in those days were coming to the store with several thousand dollars in their hands, wanting to buy a computer for the kid, "so junior won't fall behind." I tried to tell people the truth, and even sent a lot of people interested in serious business applications down the street to ComputerLand to look at Apples, because I had no business software to sell them. I still sold computers like flapjacks - by the stack . . . By that first Christmas, they gave me 3% commission on top of my regular wage, and after X-Mas, they cleaned out half of the stereo dept, laid down desks, and the store manager gave me a pad of legal paper and told me to make a list of what would sell. ;) Talk about fun - playing video games and making money for it . . .

I still don't know if this is true, but that store was one of a chain then of about 12, and they only bought in bulk for everyone, so I suppose they were depending on your basic pimple-faced computer dweeb kid to buy their stock . . . hehehehehe . . . I sold for awhile (I bought a 600xl, a 1030 modem, and a 1010 recorder) and left when the bottom started to drop out of the Atari/C64/T199a markets, and went to college.

About 4 years, 2 jobs, a beard and another try at college later, I was given the name and address of the local Atari club Pres., and asked to meet him, (hoping I could find some schematics for my 600 - eager to put my new electronics skills to the test...) I went to this guy's mobile home, one room of which was full, floor to ceiling with disks, hardware, all kinds of goodies... and asked him about the schematics. He said he didn't have any, but gave me a card for someone he said "If anyone can help me, this guy can - he sold me my first computer." I had to tell him that he was clueless - he had given me one of my old Lazarus business cards - and didn't recognize me! He got upset - I had to show him my drivers license.

I still used my 600 until about '90 - when I got a '286-12 from my dad. I still use the keyboard from that machine on my 386-40. I still have a big pile of 8-bit Atari & still try to keep it running - has anyone seen Mosaic for the 8-bit?

Mark Statzer Chief Engineer, KASN TV 38 Little Rock, Arkansas mstatz@cei.net

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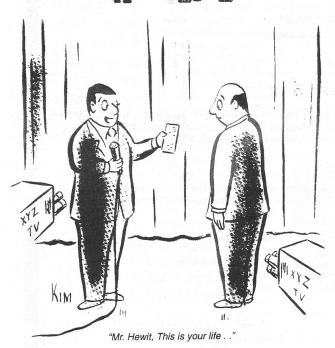


"But you distinctly said to dump the files."



"It makes everything as easy as 3.1415926..."

L_IFELONG LAUGHILINES · · ·



"Sure it looks impressive ... but can it produce Snoopy printouts?"

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THE DEC PDP-8 STORY

THE FIRST LINE OF TRULY SMALL COMPUTERS

Part II - The Minicomputer Revolution

By Douglas W. Jones, University of Iowa

n the first part of this series, the focus was on the technological innovations that allowed Digital Equipment Corporation to introduce the revolutionary PDP-8 family of computers. In this installment, the focus is on the competition and how DEC responded to maintain their leadership in the turbulent new minicomputer market of the late 1960's.

The Competition

When the first PDP-8 was delivered, in 1965, Digital Equipment Corporation was not alone in the small computer market. Control Data Corporation had originally opened the market with its CDC 160, and two other young companies were ready to meet the challenge posed by the PDP-8.

Computer Control Corporation of Framingham Mass., known by their trademark, 3C, was a successful maker of medium sized computers with a 24 bit word. Within 14 months of DEC's announcement of the PDP-5, in October

1964, 3C announced a far larger machine, the DDP 116. This was the first 16 bit minicomputer, and like the PDP-5, it was available packaged in a single 6 foot high EIA standard 19 inch mounting rack; with a list price of \$28,500, it cost only \$1,500 more than the 12 bit PDP-5.

The minimal DDP-116 configuration had 4K 16 bit words of main memory, and like the PDP-8, this could be expanded to 32K words. The DDP-116 was a single accumulator machine, but unlike the -8, it had an index register. Furthermore, the 16 bit word was large enough that, unlike the 12 bit PDP-8, no difficult to use segmenting scheme was required to address a full 32K words of memory.

Another established maker of 24 bit machines, Scientific Data Systems, also recognized the potential market for small machines. The SDS 92, announced in the summer of 1964, was a direct competitor with the PDP-5, with 12 bits per word, a minimum of 4K words, and a maximum of 32K words.

The primary innovation of the SDS 92 was not architectural, but electronic. The SDS 92 was the first commercially available computer to use monolithic integrated circuits instead of the discrete transistors used by most manufacturers or the hybrid integrated circuits used by DEC and IBM.

Neither machine was as fast as the PDP-8,



A low cost DEC PDP educational / office solution

confirming the fact that the PDP-8, was, for its time, about as fast as the technology allowed without resorting to parallel architectures. Where the PDP-8 had a 1.5 microsecond memory cycle, the DDP-116 cycle was 1.7 microseconds, and the SDS 92 was 1.75 microseconds.

In May of 1965, Systems Engineering Laboratories jumped into the market with their SEL 816, a machine with a 16 bit word, available with between 4K and 32K words of 1.75 microsecond core memory. This machine was packaged in a desk-sized unit and priced at about \$26,500.

In early 1966, within a year of DEC's announcement of the PDP-8, Control Data Corporation responded to the growing competition by announcing the CDC 1700. This was a replacement for the CDC 160 priced at under \$30,000 and incorporating the same logic modules and packaging technology as was used in the CDC 6600 supercomputer.

All of these machines were priced to compete with the PDP-5, but the PDP-8 undercut all of them by a wide margin while outperforming them by many measures. Furthermore, neither SDS nor 3C was able to deliver until May of 1965, and CDC was even later with its machine. By the end of 1966, the figures for total machines installed confirmed DEC's market leadership.

This (the PDP-8/S) was the first computer ever sold this way. complete with advertising suggesting that you drive away with a complete working computer system in the trunk of your car. As a result, some argue that the PDP-8/S was the first personal computer.

	May 65	July 66	Dec 66
SDS 92	25	42	64
DDP 116	30	55	130
SEL 816	0	19	28
CDC 160	0	0	30
PDP 8	75	250	490



"This field service engineer is not out to set the world's record on servicing a computer. However, like all field service engineers, he is fast, knowledgeable, professional, and courteous. It is men like him that give Digital Equipment Corporation "high marks" in field service."

- from DEC's pdp8/e & pdp8/m small computer handbook, 1972

Of the competing machines, the 3C DDP 116 was clearly the strongest, clearly demonstrating the value of 16 bit architectures. The strong sales figures for this machine appear to be the reason Honeywell bought 3C in 1966. SEL, although starting out at a decided disadvantage, managed to continue growing through the 1960's, further confirming the value of using a 16 bit word.

In contrast, the production of the SDS 92 never exceeded a few machines per month, and by 1966, the lesson was clear to the people at SDS. In that year, SDS released a 16 bit minicomputer, the SDS Sigma 2.

Formally speaking, the smaller IBM System 360 systems could also be classed as 16 bit minicomputers, but the smallest of these, the IBM 360/20, was ten times the price of comparable minicomputers. As a result, IBM was never a significant player in the minicomputer market of the 1960's.

The Software Counterattack

From the start, DEC recognized that software was essential to selling computers. FORTRAN II and a macro assembly language were both available on the PDP-5, ready to go to market with the PDP-8 along with a suite of

utilities such as an on-line paper-tape based text editor and a symbolic debugger. Furthermore, the DEC User's Society, DECUS, maintained a rapidly growing program library that already included 16 PDP-5 programs by the time the PDP-8 was released.

All of this software was provided in paper-tape form for those with small PDP-8 systems; for larger systems with DECtape drives, DEC offered the DECtape library system, a rudimentary interactive operating system with a command language interpreter that could be used to load and run programs from DECtape.

At the time, few computer users expected to program computers using on-line development tools. Users of IBM equipment expected to use punched cards for program development, while users of most smaller computers universally expected to use punched paper tape. Seen in this context, the DECtape library system, along with the suite of software tools DEC provided was actually somewhat ahead of the market.

The Hardware Attack Continues

The first wave of competition for the DEC PDP-8 was priced to compete with the PDP-5, but the second wave was right on target. In early 1966, Scientific Control Systems announced the SCS 650, priced at \$14,800. With 4K 12 bit words of memory, expandable to 32K. Little information is available about this machine; it may have been a clone of the PDP-8, although its 2 microsecond memory cycle made it significantly slower.

Honeywell announced the Honeywell 20, with 16 bits per word, and in 1966, Data Machines announced the Data 620, another 16 bit machine, priced at \$13,900 with 4K of memory. The latter was a rack mounted machine, only about 15 inches high, and it was clearly a significant threat to the PDP-8. 35 of these were sold by January 1967, by which time Data Machines had been acquired by Varian.

Hewlett Packard was initially a large user of DEC equipment, but by 1967, they recognized that they would be better off building their own machines, and in September, they entered the fray with full page ads proclaiming that "Hewlett Packard is now in the Computer Business." By November, 56 HP2116A machines had been sold, these were 16 bit dual accumulator minicomputers, and within a year, they would be followed by the compatible HP2114A selling for only \$9,950.

The PDP-8/S Counterattack

It would have been natural for DEC to counter with a 16 bit minicomputer, and

some people within DEC began to argue for this. By 1966, the sales figures for the DDP 116 clearly demonstrated that there was a large and growing market for 16 bit machines, but DEC avoided this move because it would have undercut their successful line of medium sized 18 bit machines.

DEC eventually did bring out a 16 bit machine in 1970, the immensely successful PDP-11. Until then, they concentrated on enlarging the PDP-8 market by introducing ever less expensive models. The effect of this strategy was the rapid opening of an immense market for small computers.

The first DEC machine along the lines of this strategy was the PDP-8/S. This was the first general purpose computer to sell for \$10,000, including the cost of the console teletype and paper-tape based software, and its introduction at this price on August 23, 1966 at WESCON had an immediate impact.

With the exception of the core memory, this machine was based on exactly the same hardware technology as the original PDP-8. The same semi-automated wire-wrap technology was used to produce the backplane and the same discrete-transistor "flip chip" modules carried out the logic, yet it was only 28 inches deep, 19 inches wide, and 10 inches high, and it weighed only 75 pounds (1/4 the weight of the original PDP-8).

The key to the economy of this machine was that most processing and data transfers were done in bit-serial fashion between shift registers. There was quite a performance penalty for this! The add operation that took 3 microseconds on a PDP-8 took 36 microseconds on a PDP-8/S, and the increment operation that took 1.5 microseconds on the PDP-8 took 28 microseconds on a PDP-8/S.

Despite the incredibly low speed of this machine, it was an immediate success in the marketplace. In just five months, over 400 machines were sold, and over 400 more were sold in the next year before DEC undercut the PDP-8/S with a faster and less expensive model. By the end of the production run, 1024 PDP-8/S machines were built.

In early 1967, the sales of the PDP-8/S were so strong that DEC was moved to break new ground in the computer marketplace by offering the PDP-8/S for retail sale on a cash-and-carry basis, available at every DEC field office in the United States. This was the first computer ever sold this way, complete with advertising suggesting that you drive away with a complete working computer system in the trunk of your car. As a result, some argue that the PDP-8/S was the first personal computer.

The PDP-8/S was not the only serial machine on the market. For example, Interdata took this approach to produce an ultra-low cost 16 bit minicomputer. In early 1967, less than a

year after the PDP-8/S came on the market, they offered a machine for \$7000 that took 45 microseconds for a 16 bit add instruction, and by the end of 1967, they had sold over 24 of these machines!

The big step that allowed Interdata to undercut DEC's price was the use of TTL integrated circuits, and the same move allowed them to advertise a parallel version of the same machine, the model 4, for \$10,000 in December 1967.

The term minicomputer was apparently coined by the head of DEC's English operations, John Leng. He wrote a sales report that began something like "Here is the latest on minicomputer activity from the land of miniskirts and the Austin mini." Although the term quickly became part of DEC's technical jargon, the first widely read public use of the term appears to have been in an ad for the Interdata 4 in May of 1968.

The PDP-8/I, a TTL Counterattack

DEC began selling M-Series logic modules, the TTL version of their Flip Chip modules, in 1967, and by December 1968, they had announced the PDP-8/I, a TTL implementation of the PDP-8. As with the original PDP-8, this machine was made using semi-automatic wire-wrapped backplanes, but the use of integrated circuits allowed approximately twice the logic to be packed onto each circuit card.

The result of this technical advance was a backplane almost as small as that of the PDP-8/S but able to operate at the same speed as the original PDP-8. Furthermore, there was room on the backplane for 8K of memory and a host of slots on the backplane came prewired for popular peripheral interfaces and CPU options.

Unfortunately, DEC had problems obtaining core memories that would operate reliably at the intended speed, so early PDP-8/I systems were run at a lower speed to compensate for this. As a result, the classic



The PDP-8/I being used to solve complex calculations in the eyeglass lens fabrication process.

PDP-8 remained in production longer than might otherwise have been expected in order to support customers who demanded full speed operation.

The PDP-8/I was offered in two configurations, a sleek table-top model with a separate power supply that stood nearby as a floor mounted pedestal, and a rack mounted version. Few table-top models appear to have been made, but by the end of 1968, over 400 PDP-8/I systems had been delivered; by the end of the production run, over 3500 were in place.

In parallel with the PDP-8/I, DEC developed another version of the PDP-8, the 8/L; this machine was designed using exactly the same technology as the PDP-8/I, but by leaving out various options, the price of the machine was cut and the size was reduced to a single 10 inch high rack mountable box almost exactly the same size of the PDP-8/S.

As an example of options that were eliminated, the PDP-8/L did not support the optional extended arithmetic units offered with the PDP/8 and the PDP-8/I, nor was there space in the basic model to expand the memory beyond 4K. DEC did offer an optional memory expansion box that held an additional 4K of memory, along with prewired I/O slots for devices that were standard on the PDP-8/L, but they resisted allowing the PDP-8/L to be expanded to the full 32K supported by other PDP-8 models.

The PDP-8/L sold for \$8,500 with 4K of memory and a teletype, and the memory cycle time was 1.6 microseconds (only 100 nanoseconds slower than the original PDP-8). When it was announced in the the summer of 1968, new orders for the PDP-8/S virtually came to a halt, and demand was so great that DEC delivered over 1000 by the end of 1969. Overall, over 3000 PDP-8/L systems were built.

The Competition Continues

In March 1968, the Israeli ELBIT 100 was announced at a price of \$5000, with discounts for bulk purchases. This may have been a PDP-8 clone, but little information is available; it had a 12 bit word, 1K words of 2 microsecond core, and 256 words of ROM, a single accumulator and a carry bit. The 4K configuration cost \$7000, and by the end of 1968, 35 machines had been delivered.

This machine illustrates the extent to which integrated circuit technology had simplified entry into the small computer marketplace. Other illustrations of this is the General Automation SPC-8, an 8 bit processor announced in October of 1968, and the MDP-1000, another 8 bit processor introduced in late 1968 by Motorola.

Ed deCastro, a long-time member of the PDP-8 design team, was one of the people

within DEC who wanted the company to enter the 16 bit market. He and others within DEC produced a design known as the PDP-X.

DEC chose not to sell the PDP-X, and in November, 1968, Ed deCastro's new company, Data General, announced their first machine, the Nova. This 16 bit minicomputer became a serious contender in the minicomputer marketplace, and many people view it as the one of the first true RISC architectures.

The Software Front

On the software front, DEC was clearly far in front of the competition. While most minicomputers were offered as barebones systems, both DEC and the PDP-8 user community had been busily building a base of generally usable applications.

While most people at the time still viewed timesharing systems and interactive programming languages such as BASIC as being the province of huge mainframes, enterprising programmers discovered that the rudimentary memory management hardware of the PDP-8 was sufficient to protect an operating system from multiple users, and the result, in 1968, was the TSS-8 operating system for the PDP-8/I. TSS-8 could support as many as 32 users, and users were free to program in assembly code or FORTRAN.

At about the same time, Richard Merrill developed the FOCAL language, a small interpreted programming language very similar to early versions of BASIC. This was able to run on a PDP-8 with only 4K of memory, and it became a popular language, both on large TSS-8 systems and on small stand-alone machines.

The combination of low cost hardware, FOCAL and timesharing allowed DEC to enter the educational computing market, selling complete computer systems to a significant number of high schools and small colleges that had previously had no direct access to computers.

Timesharing technology was also applied to the emergent word-processing market. From the start, one market for PDP-8 systems had been the control of automated typesetting systems, and with timeshared operation, this was naturally expanded to include on-line editing of the text to be typeset. The result was a boom in sales to newspapers and publishing houses.

DEC Prepares for a New Decade

Despite the obvious success of the PDP-8/I and PDP-8/L, these machines were too expensive, and too much of their success was due to name recognition and the established customer base. The root of this problem was the small size of the printed

circuit boards DEC was using. This format had been appropriate when each circuit module had a few tens of transistors, but it wasn't adequate when each board could hold ten or more ICs

The solution was to use larger boards, but this limited flexibility. In solving this problem, DEC arrived at a new solution that laid the groundwork for the next 20 years of small computer designs, the unified bus architecture. The first machine clearly designed in this style was the PDP-8/E, announced in 1970 at a base price of \$7,390.

The PDP-8/E was based on the OMNIBUS, a backplane where all the slots were wired in parallel by soldering to a single motherboard. This eliminated the expense of the semi-automatic wire-wrap machines that were required for the backplane wiring on the new PDP-11 as well as the earlier generation of DEC machines, and it reduced the "main frame" of the machine to a box with a power supply and a 20 slot backplane, expandable to 40 slots (of which 2 slots were taken by the jumper between backplane segments).

Everything else in a PDP-8/E, from the front panel to the core memory and input/output options, was manufactured on printed circuit cards with identical 144 pin card edge connectors to plug into the OMNIBUS. Where subsystems were too large to fit on one board, these were packaged as multiple boards connected by jumpers on the back edges, where needed.

The basic CPU consisted of 4 circuit boards, a master clock board, a register board, a control-unit board, and a bus terminator board. The optional extended arithmetic element consisted of 2 more boards; the basic 4K core memory module was 3 boards, and the memory management unit was one board, as were many common I/O interfaces.

Where sales of a few hundred machines had been a reasonable goal in the computer industry, and where, over the 6 year life of the PDP-8 family, only 10,000 machines had been sold, of all models, the initial year of PDP-8/E production delivered over 2000 machines, and within the decade, DEC would be able to build 1000 machines per month.

The outstanding performance for the PDP-8/E was in the face of tremendous competition from 16 bit minicomputers. Not only had DEC introduced its own machine in this class, the PDP-11, but the Data General Nova was selling well, the HP 2100 family was widely accepted, and Honeywell had brought out a series of very well designed successors for the DDP-116.

In the final installment of this series, we will will look at the final years of the PDP-8 family, following it through the microcomputer revolution until its demise in 1990.

Friends of HCS

A Listing of Associate Publications and Groups - Unique and Helpful Resources

The Analytical Engine, A 48+ page quarterly newsletter of our fellowship group, the Computer History Association of California. Published by CHAC, Kip Crosby, Executive Director, CHAC (Internet: engine@chac.org) 3375 Alma #263, Palo Alto, CA 94306-3501. CHAC is an organization somewhat similar to HCS, though somewhat different. Many of the members talk on the Internet in the alt.folklore.computers newsgroup. CHAC is concerned primarily with computers which originated in California or played a substantial role there during their life cycle. CHAC is planning a museum as soon as possible and they have a fast growing and well balanced collection of computers. Membership is \$35 a year.

The Computer Journal, A 48+ page bimonthly journal/newsletter which is the foremost text on today's CP/M (and now also PC/XT) user. Published by Bill D. Kibler, The Computer Journal, P.O. Box 535, Lincoln, CA 95648-0535. (916) 645-1670. TCJ is \$24 a year.

The Z-Letter, A 20+ page bimonthly newsletter supporting Z-System and CP/M users. Published by David A.J. McGlone, Lambda Software Publishing, 149 West Hilliard Lane, Eugene, OR 97404-3057, (503) 688-3563. The Z-Letter is an excellent resource for serious CP/Mers. It usually has a mixture of history and technical information on a variety of systems, though mostly concentrating on late 1970's and early 1980's CP/M machines. \$18/12 issues.

The STAUNCH 8/89'er, A 24 page newsletter dedicated to the H-8/89 user. Not in publication at this time, but Kirk L. Thompson, Editor, P.O. Box 548, West Branch, IA 52358, (319) 643-7136, has numerous copies of 30+ back issues which he can supply. \$3 an issue.

the world of 68"micros, A 30+ page newsletter printed 8 times a year which supports mostly CoCo's and other 68xx & 68x0x platforms. The journal is published by F. G. Swygert, FARNA Systems, P.O. Box 321, Warner Robins, GA 31099-0321 (Internet: dsrt@Delphi.com). Another fine and professionally published magazine. An invaluable technical resource for the 68' micro user. \$23 a year.

The International Calculator Collector, An 8+ page quarterly newsletter of the International Association of Calculator Collectors. Published by Guy Ball & Bruce Flamm, Co-Editors, Wilson/Barnett Publishing, IACC, 14561 Livingston Street, Tustin, CA 92680. A fast growing organization and a nice little newsletter with some very interesting information about calculator history, classifieds and discussion.

QL Hacker's Journal, A mini 12+ page newsletter dedicated to Sinclair programming and hacking. Published by Tim Swenson, 5615 Botkins Road, Huber Heights, OH 45424. Write him for more info.

Elliam Associates, P.O. Box 2664, Atascadero, CA 93423, (805) 466-8440. Sells public domain and commercial CP/M software for most CP/M based platforms. They also specialize in the Amstrad PCW. Elliam has tons of CP/M software offered in two packed catalogs. See business card ad.

FARNA Systems, Box 321, Warner Robins, GA 31099-0321, (912) 328-7859. Offering CoCo and OS-9 software, publications and support. See business card ad.

Lambda Software Publishing, 149 West Hilliard Lane, Eugene, OR 97404-3057, (503) 688-3563. A licensed dealer of CP/M 2.2 and manuals, plus a large collection of CP/M boot disks for many machines. CP/M related software manuals, fonts, word processing and spread sheets. Dealer of Z-System and *Micro Cornucopia* reprints. Disk copying.

Adam's House, Route 2, Box 2756, 1829-1 County Road 130, Pearland, TX 77581-9503, (713) 482-5040. Offering a huge assortment of hardware, software, peripherals and service for your Adam computer. Excellent catalog available.

Commercial Computing Museum Project, Kevin Stumpf, (519) 744-2900, E-mail: unusual@kstumpf.waterloordp.on.ca. A project dedicated to the acquisition and preservation of artifacts and memorabilia from the commercial use of electronic, digital computers. Please call or write for more information.

FOR THE COLLECTOR

A REGULAR SERIES FOR THE ENTHUSIAST

"Tales From the Old Days!"

By Kevin Stumpf, Associate Editor, HB, Founder of Unusual Systems

n interesting article appeared in the October 17, 1994 issue of *The Wall Street Journal*. It was about the discovery of an apparently "lost" Stratavarius and how the previous and present "owners" were handling the situation. What if the article was set in the year 2294 and it was about an antique computer instead of a violin? Might we learn something as collectors and preservationists? Let's see...

Missing Portable Case: The Finder Won't Move While Losers Sue

OSBORNE I, LOST 27 YEARS AGO, RESURFACED - BUT NEW OWNER PLAYS COY

By Kevin Stumpf, Special to The Cyber Path Journal

LOS ANGELES - Dan M. still doesn't know if he left the borrowed antique Osborne I on the roof of his car and drove off*, or if it was stolen from the unlocked vehicle while he bought groceries.

That was August 2267, Mr. M., then an assistant curator of the West Coast Innovation Museum and professor of the History of Technology at the University of California at Los Angeles, sent notices to pawn shops and used computer stores and took out classified ads. He spent the next 27 years worrying that the "One" Osborne, made in 1981, was gone forever.

It wasn't. Officials of UCLA, to which the computer had been donated, say the same computer reappeared this January. But the tale doesn't end there. University officials have discovered that once somebody is smitten with the love of an Osborne, taking it away is like wrestling a baby from its mother's arms.

Osborne Computer Company of California, made thousands of portable computers, a few of which still survive. After his company went bankrupt in 1983, factories churned out thousands of copies. And every day, people bring old portable computers to appraisers, thinking they have bought a genuine article for a song. To break the bad news to such would-be millionaires, Los Angeles antique computer dealer, Ryan C. shows them an image of a 1985 issue of *Byte* magazine advertising a clone I exercised my literary license in this paragraph as no Osborne clones exist.

But James G., an antique computer dealer in Petaluma, California, says that when a new customer left a portable computer, bearing an Osborne label, in his shop last January he thought he was looking at the real thing. The slight ruggedness of the case, the spontaneity of the boot screen, and the thrum of the single-density disk drives suggested that only Osborne himself could have designed the computer.

Hot Stuff

He browsed his copy of Domestic Commercial Computing Power Between 1950 and 1990 and found a photograph of an Osborne portable with similar scratch marks on the case and keyboard. It was the "One", an Osborne I portable computer. A bigger shock came a week later when the customer picked up the cleaned computer. Mr. G. and the customer searched an antique computer registry and saw the computer listed as stolen from UCLA.

The customer was computer buff Rachel S., who says she got the computer as a legacy of her deceased aunt. She says her aunt, who helped run a cyberservices store, kept the computer in a closet for years before her death. Where the aunt got the computer isn't known, Ms. S. says, but one piece of family lore had her picking it up beside a freeway on-ramp after

mistaking the contoured case with a rare portable sewing machine. Ms. S. contacted UCLA, but over the next 10 months declined the university's pleas to surrender the computer. Also Ms. S. didn't appreciate the unannounced visit to her home in May by two campus police officers who, she says, threatened to arrest her and told neighbors she was a theft suspect. When they reappeared last week to serve civil court papers, Ms. S. wouldn't leave her locked car. She now is staying at a hotel. And the One is in hiding. UCLA lawyers tried to get an injunction Friday in Superior Court in Los Angeles to force Ms. S. to disclose the location. Instead, university officials settled for Ms. S.'s offer to bring the computer today to a neutral museum, where it will stay, unused while the court decides who owns it.

All the fuss is over a computer that by one estimate is valued at \$800,000 - a quarter of what the best Osbornes fetch.

Computing Muse

Even an Osborne in mediocre condition can be inspirational. System wright W. Terence M., who used the One in the '60's, wrote a novel whose main character was the computer. Of the One he says: "It's neat, it's mellow, it's strong, it responds to every notion one has."

Computer buffs can have sticky fingers with such computers. One New York system hack waited until he was on his deathbed in 2285 to reveal that the Poquet computer he "played" for years was stolen from the Commercial Computing Museum nearly a half-century earlier. And Dominic S. is losing hope of writing prose on his 1984 Convergent Technologies Workslate, which disappeared three decades ago. Mr. S. says the computer has been photographed in Japan, but nobody will tell him who has it. "I have no desire to use any other computer," he says. "It became part of me, and I became part of it."

Magic Fingers

Ms. S. used her mystery computer for the first time in January. It was "nostalgic," she says, "eclectic and noisy." It even helped her understand things she hasn't been able to make her new agent do. "There are things I can't do on my own info appliances, but I can do on that portable computer," she said. During a recent telephone conversation with Roman P., a curator for UCLA, Ms. S. asked if less-accomplished system wrights or hacks might be allowed to use the computer. And she wondered "if there is any possible legal way I could keep it."

There isn't, says Celina S., a computer rebuilder and lawyer retained by the university. If the One was stolen "You can't get good title from a thief," and if it was found, the finder would have had to try to locate the owner. But Ms. S. notes in a court filing that she wasn't the finder, and that several lawyers have told her she might have a claim to the computer. Attorney Amos H., who represented her in Friday's hearing, said later that the computer could have been stolen centuries before UCLA ever got it.

Ms. S. insists she only wants what is right for the computer. The university "lost it once" she says. "They're really not careful." Mr. P. - who complains that Ms. S. is taking the university "for a ride" - says UCLA will be extremely mindful of the computer if it's returned.

There, that's my version. What can we gleam from this story? I can think of two recommendations. Keep accurate ownership records and keep your computer(s) is a safe environment. How about you, what do you think? Write me at Historically Brewed or send a message to: unusual@kstumpf, waterloo-rdp.on.ca

portable computers, a few of which still survive. After his company went bankrupt in 1983, factories churned out thousands of copies.

Osborne

Computer

Company of

thousands of

California, made

NTRO TO CLASSIC COMPUTING

FALLACIES OF COMPUTER LIGHTS Computer Christmas Trees?

By Walter Peterson, Technical Director, HCS

Today, comput-

ers lack the lights

and switches

because they

contain there

startup code in

ROM. On these

processor hits the

ground running

and never stops

during normal

operation. This

that is contained

in ROM is several

times larger than

the entire memo-

ry of those early

machines.

startup code

machines, the

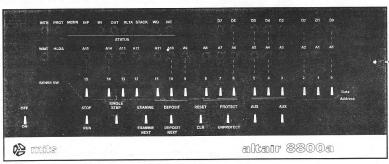
ver wonder what all the lights on some of the older computers were for? Have you ever seen a science fiction movie with a computer that did not have lots of blinking lights? Very few computers have these lights now. Why did they have them then and not now?

The answer goes back to the first electronic computer - ENIAC. In 1945 when ENIAC was completed it began working on calculating ballistic tables for the Army. The creators believed it capable of many other tasks. They wanted to show off their machine to the public, but ENIAC communicated through an ordinary teletype printer. One of the engineers who worked on the ENIAC, Arthur Burks felt that something flashier was needed. And when it was unveiled for the public in a news-reel that was seen by movie goers, it was fitted with lights that would display answers to problems. These lights were made of Ping Pong balls and arranged in columns with the digits 0-9. The news-reel showed ENIAC calculating the trajectory of a shell that took 30 seconds to reach it's target. ENIAC calculated it in 20 seconds, less time than it took for the shell reach it's target! This demonstration created the myth that all computers had large numbers of flashing lights. Virtually all computers seen in the movies after that had these lights.

Many early mini and even a few micro computers had many switches and lights on their front panels. These lights and switches were used primarily for starting up the machine and for trouble shooting problems with the software or hardware. The lights would typically show the status of the address and data busses. The switches would be used to specify an address and data to be stored into the computer's memory. I worked a little on a mini made by Hewlett Packard, the HP-1000, when I worked for a company in Orlando in 1982. To start the machine in the morning, we would have to enter in a

small (about 30 bytes) paper tape loader program into the computer using the switches on the front of the computer. After entering this program we would run the program and feed a punched tape about 15 feet long to the tape reader. The reader program we had entered would read the paper tape into the computer memory. After reading the paper tape we would run the program that had been read from the paper tape. This program was a boot strap loader for the operating system that was on a hard drive and which was located in another room. This had to be done every time the computer was turned on! This was not considered a problem because most early main frame and many mini computers were never shut off except for repair and other maintenance. Computer time back then was very valuable, and to get the most from the machine they would be run around the clock. As for the lights, they were used to display the contents of memory locations and the status of interrupts and I/O. On some machines, the lights can be addressed as I/O. On occasion these lights would be put to ingenious use. The HP-1000 I started every morning in 1982 had lights that could be used to display I/O. The HP-1000 mini computer had several users attached through terminals. Each of these users could run programs in a time-shared fashion each using some of the processor's time. The lights (LEDS) would count in binary when the machine was up and running. This was caused by an iidle time program that would increment the display register when the machine was not doing other things like running programs started by one of the users. This allowed the computer operator/supervisor to tell how busy the computer was by seeing how fast the LEDs were incrementing. The slower the LEDs were counting the busier the machine.

Today, computers lack the lights and switches because they contain there startup code in ROM. On these machines, the processor hits the ground running and never stops during normal operation. This startup code that is contained in ROM is several times larger than the entire memory of those early machines. Some early microcomputers like the Altair came with only 256 Bytes of memory(RAM). Too little memory to contain any startup code. When the machine was turned on, the



Altair 8800a Front Panel

162

processor would be waiting in a hold state. The operator would enter programs directly into the computers memory using the switches on the front panel. The LEDs would be used to examine the contents of RAM. Most of these early machines could also single step the processor through a program, allowing the operator/programmer to debug programs. This ability to single step through a program is a feature missing from modern computers. The single step on modern computers is accomplished through software using "break points", however the processor on these new machines never actually stops running.

Another less practical reason the early micros had the lights and switches common to other mini computers of the day like the PDP-8 and the HP 1000 is that the early designers wanted their machines to look like mini computers. They knew that their customers would be "technocrats" and wanted their computer to look like "serious machines". Technocrats like complicated things so they wanted there computers to look complicated. Less than two years after the introduction of the Altair, new microcomputers designed had lost most of their lights and switches.

I have an old Altair 8800a I traded for a hard drive a couple of years ago. One of the first things I wanted to do with it when I got it was to make the lights blink like the computers in science fiction and like the old

HP-1000. The 8800a does not let you address the LEDs as an I/O display. Some later computers like the Altair 8800b had this capability. To make the LEDs count binary like the old HP-1000 I wrote a program that would read a memory location serval times making the address LEDs display that address. The program would then increment a memory pointer (HL register pair) to the next location and start over referencing the new address. This process repeats forever, or until I hit the Halt switch. A binary listing of the program starting at location 0 is as follows:

BINARY PNEUMONIC

00100001	LXI	H,0000	
00000000			
00000000			
01111110	MOV	A,M	
D		. 50 .	

Repeat last instruction at least 50 times followed by:

00100011	INX	Н
11000011	JMP	0003
00000011		
00000000		

This program seems to work well on my Altair 8800a. I also have an IMSAI 8080, but it is not working and I have not had time to

fix it. But the program should work in a similar fashion on an IMSAI 8080. There may be better ways to accomplish this on other machines like the IMSAI. Anyone who can come up with a better program to make the LEDs blink on one of these old machine please write to me.

PS. One of the old games that the Altair could run was called "Kill The Bit". The object of the game was to press the switch under an LED that would light up and "kill it" before it went out. If anyone has a listing of it or has seen it run I-would love to hear from you.

Walter Peterson 967 Nott. Rd. Cape Coral, FL 33991 ACIS@gate.net



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HOME ARCADE ENTHUSIAST

BACK TO THE BASICS

New Feature

By Larry Anderson

i everyone!! My name is Larry Anderson, and I have been collecting classic home video game systems for about 2 years now. Like many of you, I got bit by the nostalgia bug when I dusted my old Atari 2600 off and remembered how many hours of my childhood were spent sitting in front of the TV playing Asteroids and Pac-Man; now, about 700 games and 30+ systems later, here I am, to tell you folks all about my wonderful hobby. Video game systems, much like historical computers, have different values to different people. My goal is to provide the reader with some insight into the various systems that were available during the early eighties, some factors that led to their disappearance in late 1984, and what exactly makes a system collectible. And of course, I have my share of collecting horror stories too.

The early eighties were an exciting period of time in the field of home electronics, both in the video game and home computer arenas. Companies were lining up at the consumer's doorstep with what they thought was the latest-and-greatest solution to their home computing and entertainment needs. Towards the end of 1983, it was pretty obvious that dedicated home computers were fitting Joe Shopper's bill, but that didn't keep the video game manufacturers from trying to fill that need as well. In this article, I would like to explore some of the attempts made to make your home video entertainment system do double duty as junior's first home computer.

The Atari 2600, by far the most widely available home game system, had several attempts made to convert it into a computer system. Here are some highlights:

- Spectravision Compumate: This gadget boasted a full 16K of additional ROM, 2K of RAM, and a 49 key touch-sensitive keyboard much the same as the one found on your old Atari 400. It had built-in Microsoft Basic, and built-in art and music composition programs. For a street price of \$80, this was by far a much cheaper investment than the \$399 premium demanded by Atari's own 400 computer.
- "The Graduate": Also given the nickname of "The Piggyback Parasite" by some of the folks in Atari R&D lab, this computer add-on never made it past the prototyping stage.
- Basic Programming Cartridge: This was a VERY feeble attempt at teaching BASIC programming using the 2600 and a pair of add-on keyboard controllers. If you had the patience to actually create a program using it, you might have been able to get your 2600 to tell you "Hello".
 - Mattel Electronics, with their Intellivision

game system, also made more than one attempt at enhancing their game console's capabilities. Mattel's Computer Module went through two design revisions. The first never made it past a test marketing run of less than 1000 units. This unit completely encased the Intellivision Master Component, and sported a full-size keyboard and built in cassette recorder. When Mattel dropped their plans to market this beast, the Entertainment Computer System was put in it's place. This module, which was styled to match Mattel's new Intellivision II console, had an additional 10K ROM, 2K RAM, additional 3 voices, and a chiclet type 49-key keyboard. Some add-on components included a full-size 4 octave music synthesizer, and a memory expansion module, the latter never seeing the light of day. 6 games were made to take advantage of the ECS's advanced capabilities, including educational titles, a music tutorial, and a very respectable baseball simulation.

Coleco, riding high on the success of it's Colecovision game console, virtually halted production of it's game system to concentrate on the development of it's own add-on module, the ADAM. Available in two flavors, one which would connect to the expansion slot of your Colecovision console, and another larger, standalone unit, this was probably the most ambitious add-on computer module. Some of it's key selling points included a daisy-wheel letter quality printer, a "high speed" Digital Data drive, built-in word processor and 80K of RAM, not to mention compatibility with the existing library of Colecovision game titles. A street price of \$699, coupled with some serious design flaws and production delays, caused Coleco to ride Chapter 11's ragged edge. Had it not been for the company's wildly successful Cabbage Patch Kids, this endeavor would have surely sunk the company.

I've only scratched the surface here, there were literally dozens of home computer/game system combos, but in the end, the home computer won. The introduction of the Commodore 64, as well as a large amount of expensive and bad software, spelled the end of the home video game industry in 1984. Since then, no other game company has attempted to make it's game console more than just a game console; they leave that task to the folks at IBM.

Next issue, I would like to share with you some of my exploits as a video game collector, and explain some of the details concerning this fascinating (well, I think it is) hobby. Since this is my first attempt at writing an article, I expect that there are some rough edges, therefore, comments are encouraged and greatly appreciated. If you have e-mail access, my internet address is larry_a@netcom.com. Until next time then!

The early eighties were an exciting period of time in the field of home electronics, both in the video game and home computer arenas. Companies were lining up at the consumers doorstep with what they thought was the latest-and-greatest solution to their home computing and entertainment needs.

For this year's vacation, there's Disneyland, the Empire State Building, and then there's the

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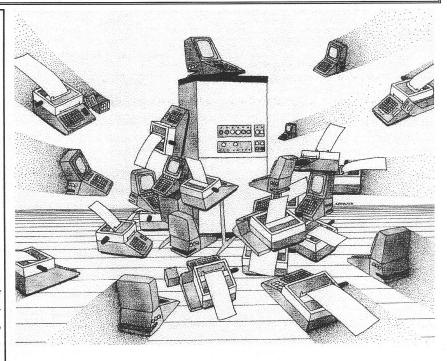
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Organized by Skip Solberg with the cooperation of the International Association of Calculator Collectors.

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The Zed-Fest in connection with the 1995 Trenton Computer Festival (TCF) will take place again this year at the Stage Depot Motel over the weekend of April 21-23. The motel is undergoing extensive changes since new management took over just before last year's Zed-Fest, so we don't know for sure which meeting rooms we will have, but we have been promised a room for both Friday and Saturday evenings for informal get-togethers. No technical presentations are planned, but I am hoping to conduct a live GEnie Real Time Conference (RTC) session right from the meeting rooms.

There will again be an "All-Day CP/M Conference" on Saturday as part of the Trenton Computer Festival at Mercer County Community College. For more info contact Jay Sage at (617) 965-3552 or e-mail: SAGE@LL.MIT.EDU.



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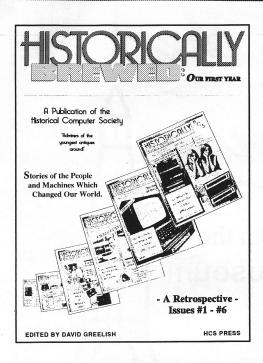
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- What's In your HB -

HB Letters
Cartoons
Ed Roberts Interview5
DEC pdp-8 Story - part III
The Internet
For The Collector
The Atari 8-Bit
The Beginnings
Gary Kildall Remembered
Home Arcade Enthusiast23
Classic Arcades24

HB LETTERS

BE A PART, WRITE IN NOW!

Readers share their stories, collections and comments. Isn't it time **YOU** wrote in with your computing lore?!

GAMES GALORE

Well, since you asked...

I'm actually a videogame collector, and stick mainly to cartridge media, but that still gives me cause to pick up the occasional computer for the collection. So far, that list goes like this:

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So you can see that even as a videogamer, there's plenty of stuff to find. God help me if I ever decide that CDs are collectable in themselves and I have to begin hunting down PC games...

Also, though I don't have the... guts... to collect floppies and cassettes, I would love to see someone put these games (on ONLY magnetic media) onto more durable media (either cartridges for the original systems, or on CD for emulators).

I'm involved in a project to put 12 games (the 13th has apparently gone to the bit-bucket in the sky, unreleased) for the 2600, originally released on cassette, onto a CD. Hopefully someone will follow our lead and preserve mag-media-only games in a similar manner.

About #8... I have a C-16 too, only I also have the cart Strange Odyssey (or something like that). Does anyone know what other cartridges were available for it? I'd love to get my hands on more...

On the subject, did the Commodore Plus-4 take cartridges, or more specifically game cartridges (yes, I'm more interested in the recreational aspects of old computers than the practical — I'm a videogame collector like Larry Anderson)?

Speaking of Larry... He mentions the Graduate 2600 computer add-on even though it was never released, but forgot the Unitronics Expander II and Entex Piggyback that were announced but never released. He also missed the PGP-1, which allowed you to code over cartridges (temporarily) so you could do all kinds of weird things to your games; if you knew machine code that is. It was released in test quantities, and I need one badly.

He mentions the BASIC cart, but entirely forgets MagiCard, a cart that let you program games in machine code. It was only made in small quantities.

As far as your Most Obscure Computer contest, what about the Bit 60, from Bit Corp, which played 2600 cartridges, and supposedly only one NTSC model exists (unfortunately, it's not me that has it — sell me one?).

This one isn't as obscure, but it has the videogame connection... Who knows about the Exidy Sorceror, and who wants to sell me one? In case you don't know, Exidy made arcade games.

Russ Perry Omro, WI

COLLECTING PROGRESSION

Dear HCS,

The book arrived Friday! Wonderful job. I

have thoroughly enjoyed reading it. I am not necessarily a collector, but I do appreciate computer history, and have a pretty decent library. My first computer was a Mac 512K in 1986, and currently have a Mac Quadra 650. My wife has a Powerbook 100, and my daughter (7) has a Mac SE. However, I also owned a CoCo 2 which I played with for a couple of years, and a Tandy 102 which I sold after I bought the PB. Right now, I also have an Apple IIc, a IIe, and a][+. The IIc is still used on a monthly basis the other Apple //'s are "in storage." I also have a Tandy 200 laptop for occasional ham radio use. I attend a lot of ham radio swaps, and the latest one in Chelsea MI would have probably gotten a lot of excitement out of some of your readers. I saw numerous Atari 800-type machines, TRS-80's, C-64, a few VIC-20's, and others. Many folks are simply giving the TRS-80s away because they cannot sell them, and others are selling old systems for peanuts. A buddy bought an Apple //c with the 9" monitor and manuals, etc. for \$30. That kind of buy is rare, though. However, I did sell 2 Mac 512Ks with external drives (in perfect working order) for \$50 each, because I needed to clean out some space. At this particular swap, someone left behind a bunch of old IBM terminals because they couldn't even give them away. If you or any of the HB readers want to see a LOT of old computers, the Dayton Hamvention is the place to be. With over 1,000 flea market spots, there is bound to be a piece of ancient computer hardware that he or she would be interested in. The Dayton Hamvention is the second weekend of May in 1996. The attendance for 1995 was about 41,000! Keep up the great work! Hopefully, I'll find the time to write an article for you.

Mark F. O'Brien University of Michigan, Ann Arbor mfobrien@umich.edu

Dear HB,

I just received your publication Historically Brewed Our First Year. I enjoyed it's contents. I am also a collector of important old computers. Being the same age as Bill Gates, I grew up witnessing the personal computer revolution. I have recently purchased an IMSAI 8080 to add to my collection which includes an Apple I (yes I) and a Mac 128K, and an Osborne I, Apple IIe.

I am currently trying to put together and complete an old S-100 bus computer I started building in college. I look forward to receiving your publication.

Sincerely,

David N. Okada Chandler, AZ

PERSONAL, CORPORATE COMPUTER MUSEUM

Dear HB,

My partner and I started our business as ComputerLand of Baltimore in 1981. I had a few machines before we opened. I am setting up a small microcomputer museum in our office. I am extending an open invitation for anyone to look at our collection at System Source, 338 Clubhouse Road, Hunt Valley, MD 21031.

While I have serval vintage machines, (IMSAI 8080, ASR-33 etc) my collection traces the development of major technologies. One panel shows the development of RAM from the Core through current SIMMS. Another panel has a 110 Baud Modem, 300 Baud Acoustic, Hayes Micromodem 100, through a 28.8 PCMCIA card. I have similar displays of processors, disk drives and printers.

Sincerely

Bob Roswell Hunt Valley, MD

Hello,

About 10 years ago I rescued an MITS Altair 8800 from my neighbor's trash pile. Recognizing it to be a historical piece of the computer era, I have retained it to restore one day. While rereading my Fall/Winter 1994 (Issue #7) sample copy of the *International Calculator Collector*, I came across your organizations name in the "Resources: Other Organizations". I am interested in receiving more information about *Historically Brewed*.

Sincerely yours,

Scott Ellinport North Miami Beach, FL

NEW SOURCE OF HISTORY

Dear HCS,

Please find enclosed details of my new book called *Sinclair Archeology* and also of my exhibition with the same title I am currently holding at the Hove Library.

Also enclosed **press cuttings** with Sir Clive who visited the exhibition and found my book **"astonishing"**.

Should you wish to do a full **review** I would be glad to send you a copy. Hoping to hear from you soon, I am

Yours Faithfully,

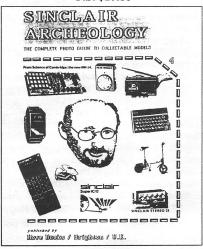
Enrico Tedeschi – Brighton, United Kingdom

Enrico.

Wow, your book looks interesting. Yes, please do send us a copy for review! Sir Clive is the "King of Gizmos". I've been wanting to learn more about him and about some of the other things which he invented (other than the Timex/Sinclair 1000). If any readers are interested, write:

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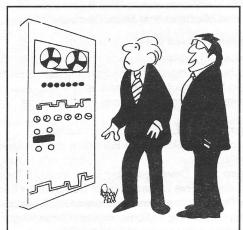
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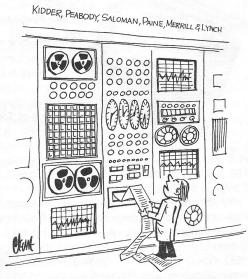
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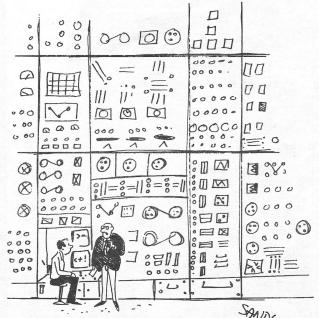
COMPUTIN' IN THE OL' DAYS



"Yes, progress is wonderful. This little baby only set us back \$75,000 and we replaced a \$90-per-week clerk with it."



"What do you mean, you deserve higher voltage?!"



"Yeah? Well, it doesn't make ME feel lowly and insignificant."



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A TALK WITH THE CREATOR?

AN INTERVIEW WITH ED ROBERTS

Inventor of the First Viable Personal Computer

By David A. Greelish, Editor

The basic

ground rules for

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technical stand-

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d Roberts is the Father of the Personal Computer. Now, you can argue the point, but it is generally accepted that the MITS Altair, circa 1975, was the first mass produced, commercially successful personal computer, and Ed Roberts, with some help, masterminded its creation and success. Here is a short version of that great American success story, as it was printed in our very first issue -

The Altair

Leslie (Les) Solomon was the Technical Editor for *Popular Electronics* during the summer of '74 and he was looking for a good computer article and project to print. Both he and Editorial Director, Arthur Salsberg wanted to publish a piece on building a computer at home. Solomon had received some articles, but they were not what he was looking for. "A rat's nest of wires," as he would describe them. But, Solomon encouraged his writers to send in their best ideas.

Ed Roberts was one of "Uncle Sol's" writing contributors. A man who loved to fool with gadgets and electronics, Roberts started a small electronics company in Albuquerque, New Mexico in 1968. MITS (Micro Instrumentation Telemetry Systems) mostly sold radio transmitters for model airplanes through the mail. But, by the early 70's, MITS was selling calculator kits and doing fairly well.

At the end of 1973, the calculator mar-

Ed Roberts

ket changed drastically, other companies were selling fully assembled calculators for below \$50, while Roberts' kits were \$99.95. He had to think of something quick or go broke. He had toyed with the idea of developing a computer kit before, but never followed up on it. Now, he decided to go for broke. If this didn't work, then he would just close up shop.

Roberts decided on the Intel 8080 chip for his project, rejecting the older 8008 and new Motorola 6800. He was able to get an excellent deal on the chip in volume - \$75 a piece for a \$360 chip! By mid-1974, Solomon had decided on supporting Roberts' article and kit. He staked the reputation of *PE* on the expertise of MITS. In July 1974, *Radio Electronics* had published an article on a 8008 based computer kit called the "Mark-8". Les Solomon needed an 8080 based project to beat out *RE*.

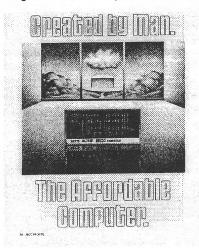


An assembled Mark-8 kit.

MITS worked feverishly on the computer, creating an expandable main circuit board that had a data bus with 100 separate paths. It was capable (in a miniature way) to do anything that a large mainframe computer could do. Les Solomon's daughter, Lauren, gave it it's name "Altair" because that was where the Enterprise on STAR TREK was going that night. He had asked her for a name idea and had asked what they called the computer on STAR TREK. "Computer," she said. Altair was the better name.

The Altair kit appeared on the cover of the January 1975 issue of *Popular Electronics*. In kit form, MITS offered the basic model with 256 bytes of RAM, standard binary switches

and LEDs on the front panel and power supply for \$400. Hoping to sell around 200 kits, Ed Roberts and MITS were overwhelmed to receive thousands of pre-payed orders. Electronic hobbiests were willing to have paid the \$360 just for the chip itself, so why not get an entire computer for \$400? It



An early MITS Altair ad ran in *BYTE* magazine (1975).

took MITS almost a year to catch up the orders. Over 10,000 Altairs were sold by MITS.

The Altair was the first commercially successful computer ever. It started the personal computer revolution which has since consumed our planet. Imagine the world just 18 years ago (almost 21 years ago now, DG) when there wasn't a computer in every pot.

- O.K., well that pretty much sets you up for our interview if you weren't already familiar with the story that began it all. Ed Roberts is now a doctor and lives in a small Georgia town named Cochran. I drove to his office one weekend earlier this year to talk personally with a man who I have read so much about. Our informal discussion spread well over two and a half hours, here are the highlights:

Do you remember the "T.V. Typewriter" and did it influence you at all? Were you excited about its appearance?

I remember the T.V. Typewriter and we were building something like it if I'm thinking about the same thing - we built a

computer terminal which we actually sold off and on up to when Pertec took over. We used a Burroughs display which was a neon display that had dot matrix output. It had a modem built into it and you could put the phone receiver right into the top. It was something similar to what Lancaster had written about. He was a real pioneer with mail order kits and a lot of the stuff that he did served as a model for M.I.T.S. The one thing that I remember he did that really impressed me was sometime in the mid '60's. He created a decimal counter made out of small scale integrated circuits that could count from 0 to 10. You could stack these things to make a bigger counter. It was really neat even though it doesn't sound like much these days. We used a Teletype more than anything else on those initial machines. Those old ASR-33's with the paper tape gave you a way to input and output as well as a way to load data. You could buy them used for only a few hundred dollars at the time.

That was kind of a gift from heaven at that time - the ultimate peripheral!

Yeah, you got your line printer, your input / output device and your mass storage.

When you first decided that you wanted to create a personal computer, what were some of the things that you thought it must have, and did you ever say I definitely don't want it to be like this?

The basic ground rules for a personal computer from a technical standpoint is that it had to be a real, fully operational computer that was fully expandable and at least in principal could do anything that a general purpose minicomputer of the time could do. "Minicomputer" was the term them and referred to any 16-bit or 8-bit machine. And, those were the ground rules. We wanted to make a machine that was, from a users stand-point, not degenerative at all. The main difference between our machine and where others were, is that we used microprocessors and everything was the latest state of the art. We never used core memory even though we did look at core. At the time we began work on the Altair, core memory was still significantly cheaper than IC based mem-

You used static memory first and then dynamic, right?

The original machines had 256 bytes of static, and that was the minimal configuration. That board in the machine came that way and was expandable up to 2 Kb. We later developed a 2 Kb, 4 Kb and ultimately a 16 Kb memory board before I left; there may have even been a 32 Kb board. We did sell both static and later dynamic memory.

HCS has a few MITS Altair memory boards. OK, did any particular type of minicomputer influence you? I've read that it was a PDP that you most



Dr. Edward H. Roberts, M.D. in his office.

favored.

We had a Nova 2 by Data General in the office that we sold time share on, and as a matter of fact that was how we got into building a little terminal. The front panel on an Altair essentially models every switch that was on the Nova 2. We had that machine to look at. The switches are pretty much standard of any front panel machine. It would have taken forever if we would have had to re-decide where every switch had to go. These guys had already figured it out. That's pretty much the way technology works. If you were going to build a machine today that would allow front panel control, it would look just like an Altair, or Nova, PDP-10 or any of those front panel computers. There are certain switches you need to get an address in, to get data in, to single step it, look at output and reset it.

What were the series of products that MITS had? You had your radio remote control devices, then went to calculators and then computers right?

The very first product that we made and was featured in Popular Electronics, was an optical communicator; it was a laser communicator, but it used infrared diodes and wasn't really a laser. We had lenses that we produced ourselves, and it was sold as a kit. They had a range of 500 or 1000 feet. It was actually a pretty good little product. We sold 100's of them which was pretty good for only two of us working out of a garage. There was only one calculator ever featured in Popular Electronics I believe; we made the 816 a & b, the 1440, which had square root, we made a machine which had fourteen digits and square root and memory, also we made a hand held scientific machine. I think we made two or three different models of those. We also produced a scientific metric converter, logic analyzer, function generators and a whole bunch of products over the years.



Early MITS prototype calculator.



The original Altair 8800.

And as far as the Altairs, let's see, there was the original 8800, 8800a, 8800b, 680, 680b and your turn-key 8800b and 680b. What other peripherals?

When I left MITS in 1977, we offered about forty different computer products. We offered two or three memory variants, I/O boards, serial and parallel cards, disk controllers and D to A converters. I think we also had a controller for the really big drives that we produced for somebody. We had another machine and I'm not sure what Pertec did with it after I left, but it was a self-contained computer that came with either a 40 digit or 64 digit display. It was sort of an "Apple" before the Apple [came out. As a matter of fact, it was somewhat like what Processor Technology came out with later. With the Sol computer, they used the "Altair Bus" and incorporated a keyboard and the display control in one box. It was still an Altair bus compatible machine. That's a bit of a sore point that everyone changed the name of the bus.

Yeah, I've read a lot about that.

Nobody wanted to steal the name, they did that because they hated to give us credit every time they talked about their own product. A bunch of vendors got together and decided to call the bus "S-100". We should have copyrighted the name or patented the bus, but we never did that. Anyway, the Sol was an Altair based bus machine and really was an "Apple" before the Apple][. It was a good machine and they were good competitors. As a matter of fact, the company that I think about out of all of the old companies more than any other is Processor Tech, for a couple of reasons. Number one, they were good competition, building good products, mostly add-on products. They were the first people to build add-on products for the Altair that I felt were of any quality. There was tons of junk stuff being built, but those guys did good work.

I've always heard good things about Processor Tech. We have a Sol, and it is an interesting twist on the Altair's design.

And the funny thing is, that I bet every time I have made that comment in any indepth interview, the only story that is ever told about MITS and Processor Tech, is about the first ever Altair Convention in Albuquerque. It was David Bunnell's idea (MITS' Director of Marketing), and I said "Dave, this is crazy, we're not going to get people to come all the way to Albuquerque to go to this convention."

But they did!

They did! Tons of them! He was absolutely right. Anyway, Processor Tech showed up and they had a suite up on the ninth floor of this Airport Marina Hotel where the convention was, and they had a sign down in the lobby that said "Processor Technology". David Bunnell tore up their sign or made them take it down or something. I was unaware of this and didn't have anything to do with it. It created more flack to hurt us then if we had just ignored it.

Yes, I too have read that you were responsible for that.

David worked real hard on the convention and it made him mad that those guys were going to get some benefit from what he had done. But anyway, that's the only story that gets printed. Nothing that I have ever said good about Processor Tech ever gets printed. They identified some of the problems in the Altair and created good products to fix them. It's hard to really say anything bad about them. You know, it's the stuff that sells when you're writing an article . . .

All the bad stuff - the dirt! Yeah, I'm not trying to get at any of that. For me, it's just interesting to talk to you and to hear what you have to say about the events of the time. I'm trying to constantly think of something to ask you that is different from anything published before. The basic story has been told so many times already. I just remembered one somewhat silly question that I wanted to ask you - what type of computer do you use now?

All of the machines that I have now are PC based machines. At the house, I've got a 486DX4/100, NEC Versa portable 33

and a Z-Lite 486 black and white, which I really like.

I remember reading somewhere that you really liked your "gadgets" too! I guess that hasn't changed over the years!

That's true! Isn't it true about most people who like computers though? I remember I made a comment at that show which got some publicity and I haven't heard much about it recently. I don't know if you remember when Carter was running for President, but he made the comment that he "used to lust after women" or something like that. Well, all of us who were connected with computers then lusted after computers. Computer users now are very different kinds of people, mostly business users. To have a computer in the old days was better than sex; it was really something exciting.

I can tell you from my experience working at CompUSA, that the majority of people buying computers - don't even know why they're buying one, they just think they "should" have one! That's not really a good reason to buy one, but that's what is going on in 1995.

Yeah, the difference is that then, people lusted after the machines and wanted them. To a large extent, they didn't know what they were going to do with them, but they knew that they wanted one. These were mostly people who used computers professionally.

What do you still own? Did you keep some of your favorites?

There are two Altairs in here and both are "brand new". They have never been used, just checked for power. There is an "a" model and a "b". They were wrapped up until recently. We had a Japanese crew come in and take some pictures.

Do you have any favorite user stories you would like to share?

There was a dentist in Chicago who was one of our very first customers. He wanted to use the Altair to control a massive model railroad. And that was a real eye opener to us that people were coming up with applications and ideas that we had never even imagined. It makes me think of that old adage that if you gave and infinite number of monkeys an infinite num-

ber of typewriters, that one of them would write *King Lear*!

And with the computer - sooner or later, someone will come up with something amazing!

And that was something that always intrigued me. When I was going to school between '65 and '68 at Oklahoma State, which was a very "forward thinking" school believe it or not, they had an IBM



Ed's "brand new" Altairs!

1620 in an open lab. No one monitored the machine. This was a big machine with a lot of money invested into it. It was open to engineering students and we would go down there and just put our name on a roster to use it. It was fantastic! And that had probably more impact on my feelings later on about computers than anything else. Computers had always been sort of "Mecas" up to that point.

Did you ever have one of the minicomputer companies buy an Altair just to check it out?

It must have been around late 1975 or early 1976, I remember it was before we moved into our new building, but anyway, we met with IBM in the MITS' executive lunch room. The lunch room was located behind my back office, through an alley and in the Dairy Queen! That's what we all called the MITS' executive lunch room! Anyway, IBM showed up with a bunch of lawyers and wanted us to be a witness in their case against Memorex I think it was. Apparently Memorex was suing IBM for monopolistic practices. IBM came up with some figures that showed MITS and our Altair to be increasing the supply for computers in the world by 1% each month. They wanted to use us in court to show that we were producing more computers than even they were at that time! I think that was a big reason why they came to MITS, but also I think they came to check out what we were doing.

Can you remember the most famous or unforgettable person who bought an Altair?

The guy who did some of the special effects for Star Wars, or I believe Star Wars, came out to MITS and bought some equipment. I can't remember his name. Lets see, we also sold stuff to the Secret Service, the FBI and the CIA. They were bought up by all kinds of people.

For the most part, they could take the place of any minicomputer at the time.

It took the industry a long time to

realize that microprocessors and microcomputers were also very useful. People went through this thing where there were "supercomputers", there were "computers", there were "minicomputers" and then there were "microcomputers". Everyone assumed that when you said "microcomputer" you were talking about a performance thing. A microcomputer was really a technology and that was one of the arguments which went on at the time - the term "microcomputer" didn't same a thing about it's performance, they were missing the whole point. Microprocessors were approaching the power of minicomputers even with the Intel 8080.

I guess really the only thing that minicomputers had over micros at the time was the fact that some were 16 and 32 bit which made them somewhat more substantial. Right now with the high end Pentiums and PowerPC's, you essentially have the raw processing power of the supercomputers of fifteen years ago which cost millions of dollars.

I made a prediction actually, which everyone at the time thought was a joke, that the personal computer would destroy IBM. They made a big hit with the PC, but almost went belly up here recently.

I remember that, they laid off thousands all over the world, but somehow they seem to have made a come back. Their "ThinkPad" is extremely popular and their "Aptiva" systems are doing modestly well.

There's nothing "Gee Whiz" about their desk machines is there?

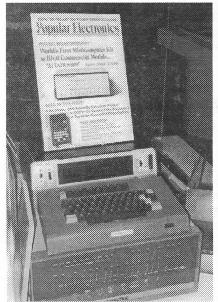
No, nothing that I have seen. In my personal opinion, I still think Apple is the biggest innovator out there. I'm no engineer, but they still seem to consistently come up with the new original ideas and everyone else copies them.

You know, Dave Bunnell, who still keeps up with most of the new technology says that the thing that is kind of interesting to him, is that if he goes to a meeting with PC users or a meeting with people who use Apples; the Apple users look a lot more like the early MIT's customers than the PC users. With the Apple users, you can see the same enthusiasm and excitement they have about their machines. They seem to "love" their computers which is a different kind of mentality.

I think you're right, Mac people are still very enthusiastic about their computers. I guess it has to do with being a minority or something.

Yeah, they're still kind of considered the "little guys" amongst PC users.

And maybe back in the Altair days the hobbyists and electronics guys were kind of a minority too - a specialty group of people who had to stick together because everyone else thought they were sort of weird.



Here's what started it all.

MITS' 20 Year Reunion

in Albuquerque by Steve Shepard



Just some of the "Giants" of the personal microcomputer revolution.

mong the requisite booths of hardware and software dealers, there was one anachronism at the New Mexico Computer Fair and Expo. A panoply of MITS products (the majority of which were supplied by your author), from pre-Altair calculators to the last purely MITS product, the little known Attaché computer (this was a cut-and-chopped Altair 8800b turnkey computer mounted in a cabinet with a built-in keyboard, much like an oversized TRS-80). The Expo, which took place in Albuquerque June 9, 10, and 11, also exhibited an Altair 8800 (the one that started it all), an 8800b, a 680b, and an unreleased version of the Altair 680b turnkey computer dressed in ICOM label and colors. There was a working 8800b turnkey system, which continually scrolled, at 300 Baud, pertinent Altair facts across the screen of an ancient Beehive terminal. This was a big draw!

An exhibit of most of MITS' line of Altair boards was present, including a 1K memory board and their largest, the 16K static RAM board. Various serial and parallel I/O boards, printer controllers, cassette interfaces, and hard and floppy disk controllers were also seen. A 4-channel music board, a 24-channel, 12 bit analog to digital converter, and the never released Z-8O CPU board were a few of the more exotic boards. Shown too were miscellaneous MITS items such as an Altair T-shirt portraying the original upside-down power switch, numerous examples of the very creative Altair magazine ads, a pile of MITS' Computer Notes magazines (most containing Bill Gate's Software Notes columns), and several examples of magazines from the early days, such as Byte #1.

The MITS display seemed to attract a great deal of attention from two groups. The first was composed of "old-timers" who remem-

bered these machines and had actually used them. There were many interesting and amusing stories to be heard from these people. The other group was composed of young people who seemed to be amazed at the archaism of such relics, and even more amazed that the old-timers had actually used them. I heard a few amusing comments from these people, too.

In conjunction with the Expo, the local computer magazine, Computer Scene, sponsored a reunion of about 100 of the approximate 300 former MITS employees and family members at a dinner party in honor of the occasion. We were fortunate to have Dr. Ed Roberts, Dr. Eddie Currie, David Bunnell, and Paul Allen on hand as the VIP guests of honor.

MITS technical writer David Bunnell, who later started *Creative Computing*, *PC World*, and *PC Magazine*, among others, talked of the early days of the Altair and of the ceiling-high stacks of orders following the famous *Popular Electronics* introduction. He pointed out that MITS not only initiated the personal computer, but also started the first computer store, the first personal computer conventions (the World Altair Computer Convention), and published a diversity of the first PC software of real significance, such as word processing, accounting, and inventory control, and of course, MITS' (later Microsoft's) BASIC. "Nineteen eighty one's IBM PC was really just an upgraded Altair in most respects", he noted.

Microsoft co-founder Paul Allen told of his 1975 arrival at MITS and of seeing his first Altair 8800 with "the most RAM of any micro in the world - 7K!" This was the same machine upon which his and Bill Gates BASIC was first run later that day.

The inventor of the personal computer, Ed Roberts expressed his disappointment in the historical viewpoint of some that the Altair was just a hobby computer. "It was, after all, the first business computer, too, and was used in thousands of offices around the world to run early business software."

Some unexpected attendees were a film crew for a PBS/BBC joint venture. Stephen Segaller of Oregon Public Broadcasting is producing a three-part serialization of the book *Accidental Empires* by Robert Cringely, and some of the first episode will apparently be concerned with the Altair phenomenon. The crew spent many hours interviewing past employees and the VIPS, shooting the reunion proceedings, and taking a lot of footage of the displayed equipment.

Roberts' comment, and those of Bunnell, too, seemed at times to be squarely aimed at Cringely, whose mention of the Altair "hobby computer" would barely fill a paragraph in his book. Cringely stated that he was adding a lot of material to an upcoming rewrite. Presumably, the new edition will concede more import to the pioneers. It will probably be released along with the TV series around March '96.



THE DEC PDP-8 STORY

THE FIRST LINE OF TRULY SMALL COMPUTERS

Part III - The Concluding Years

By Douglas W. Jones, University of Iowa

n the first two parts of this series, the focus was on the technological and marketing innovations that pushed the Digital Equipment Corporation PDP-8 into a dominant position in the minicomputer market of the early 1970's. In this final installment, the focus is on how DEC continued to successfully market the PDP-8 through the years of 16 and 32 bit minicomputers and well into the era of microprocessors.

The Competition

The DEC PDP-

\$4990 without a

teletype when it

was announced

in July, 1970. This

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the older PDP-8/L

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also offered

new Omnibus

backplane."

8/E sold for

The minicomputer market of the early 1970's was large and growing. While DEC rightly claimed, in a January 1971 ad, that the PDP-8 was the yardstick by which all other minicomputers were measured, the market was already dominated by 16 bit machines.

A survey of the minicomputer market published in May 1971 showed 49 minicomputers on the market, made by almost as many companies. Of these, 36 had 16-bit words, 4 had 12-bit words, and only 8 had 8-bit words (Motorola's offering was one of the latter).

A followup survey, published in July 1974, showed only two 12 bit machines, the PDP-8/E and the Nuclear Data 812. All of the others were 16 or 32 bit machines, with the exception of a handful of low-end 8 bit minis.

Looking at the sales figures, on the other hand, the PDP-8 was by far the dominant machine! In the 1974 survey, the PDP-8 was the only machine listed with an installed base of over 12,000 machines. The closest competitor listed was the Hewlett Packard 2100 family, with over 5,000 machines. (It should be noted that Data General's sales figures were not released for this survey.)

Technological Developments

While the growth of hardware technology in the 1960's was largely driven by the mainframe industry, many of the new technological developments of the 1970's were driven by the growing market for small computers.

While many of the fastest mainframes were still being built using proprietary hardware technology, the minicomputer industry embraced TTL logic and became the driving customer behind many of the developments in MSI and LSI fabrication. The announcement of the first microprocessor in January 1972 was widely expected. Nobody knew that it would be the Intel MCS 4, the 4004, but many expected that one of the chip fabricators would soon come out with something of that sort. In fact, the HP-35 calculator, announced in February 1972, clearly demonstrated that HP was also able to produce LSI chips of similar complexi-

The peripheral marketplace of the early 1970's was clearly dominated by devices designed for the mainframe market, but certain minicomputer applications demanded smaller peripherals and more convenient storage media. IBM, having first used the floppy disk for microcode loading in their mainframes, was quick to exploit this with the 3740 diskette based data entry workstation, announced in March 1973, and after Shugart announced the SA 900 IBM compatible diskette drive, four months later, the industry quickly rec-



"A PDP-8 in every room - The small, versatile PDP-8 can be used right at home. This user finds the PDP-8 most convenient in his profession; in fact, the whole family enjoys the PDP-8." From the pdp8/e & pdp8/m small computer handbook, 1972

ognized that the 8 inch diskette was a winner.

Minicomputers also demanded inexpensive terminals. Nobody really liked the ubiquitous ASR 33 Teletype, and when Lear Siegler Inc. introduced the LSI ADM-1 "glass teletype" terminal priced at \$1500 -- the same price as a teletype, it was an immediate hit in the minicomputer and timesharing markets.

While many minicomputers continued to be purchased directly by their end users, more and more machines were being purchased by OEM customers -- the

Original Equipment
Manufacturers who incorporated computers into their
products, ranging from industrial control equipment to elevator controllers to word
processing systems.

The OEM marketplace was very lucrative! Sales
to end users required an extensive investment in customer
service, support and training,
but OEM customers were
expected to take care of these
expensive details themselves
when they resold systems to
end users. Some of the smaller
minicomputer makers only
sold to OEM customers,
thus completely avoiding these
costs.

DEC's Response

The DEC PDP-8/E sold for \$4990 without a teletype when it was announced in July, 1970. This not only undercut the older PDP-8/L by \$2000, but also offered immensely more flexibility with the new Omnibus backplane.

It was not, however, enough to offer the automatic market advantage that was suggested by DEC's October 1970 advertising slogan: "If the new PDP-8/E is so great, how come it's so cheap?"

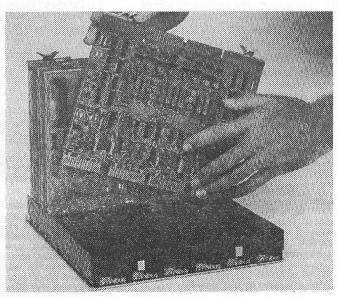
In fact, only two months before the PDP-8/E came on the market, Digital Computer Controls introduced the D-112 at almost exactly the same price. This machine was advertised as being both plug and software compatible with the PDP-8/L, and it was available only to OEM customers.

The most impressive PDP-8 clone came to market later. The Fabritek MP-12, offered in June 1974, was available to OEM customers for \$990 each, in lots of 100. This machine was only 2

inches wide, 9.5 inches high, and 15 inches deep.

DEC's first response to the market demand for low cost OEM hardware was the PDP-8/OEM, announced in October 1970 at a price of \$3250, or \$2800 in lots of 100. This was a PDP-8/E, stripped of its flashy looking front panel and its core memory, and outfitted with 256 words of ROM and 256 words of integrated circuit RAM.

In 1972, DEC brought out a new power supply and backplane for their omnibus machines. The original PDP-8/E



PDP-8 Modules mounted on the OMNIBUS

power supply used inefficient linear regulators, while the new PDP-8/F and PDP-8/M power supply was a compact and efficient switching supply. DEC continued to make the PDP-8/E for those customers who wanted large configurations requiring more than 20 slots in the backplane, while they packaged the new switching power supply in a small package with no room for an internal backplane extension.

Physically, the PDP-8/F and PDP-8/M are identical machines; the 8/F was sold to end users, while the 8/M was sold to OEM customers. Because of this, most 8/M systems had no front panel, although it was an available option. Many PDP-8/M systems were almost certainly configured along the lines of the 8/OEM, using a ROM to hold the application code.

While the PDP-8's memory seems small by today's standards, almost all of the early minicomputers were offered with around 4K words of memory,

and the limit of 32K 12-bit words on the PDP-8 was respectable -- this is 48K 8-bit bytes, exactly the same as the standard maximum for the PDP-11/20, although some

ambitious users managed to squeeze in an extra 8K of core into their PDP-11/20 systems.

In fact, in May 1972, DEC brought out the FPP-12, a floating point coprocessor for PDP-8 and PDP-12 systems, and with this and a new FORTRAN IV compiler, DEC took on the IBM 1130, an aging but still common mainframe.

In July 1972, DEC advertising countered the generally held view that the PDP-8 family was nearing obsolescence with the slogan "It's as current as a PDP-8", featuring the OS/8 single-user operating system and the COS/300 commercial data management system.

Surviving The Microcomputer Revolution

Some of the patterns of computer use we associate with the microcomputer revolution were well established in the early 1970's. In a 1973 article on Minicomputers published in *Datamation*, it was noted that Ken Olson, president of DEC, was a long-time

owner of a home computer, and that DEC had a policy of offering PDP-8 systems at a bargain prices to DEC employees who wanted their own home computers.

In the same month, DEC began the EduSystem marketing program, in an effort to enlarge their already large share of the educational minicomputer market. At the time, Hewlett Packard was their only significant competitor in this market segment. The configurations offered ranged from the EduSystem 5, a PDP-8/E with 4k, a teletype, and BASIC pre-loaded in core (with paper tape for re-loading, if needed), to the EduSystem 50, a large PDP-8 based 16-user time-sharing system with disk and DECtape drives.

In February 1975, DEC followed up on the EduSystems with the CLASSIC, the CLASSroom Interactive Computer, a PDP-8 based workstation built into a desk with an RX01 dual 8-inch diskette drive, a 32K PDP-8, and a VT52 video terminal on top, with an advertised cost of \$200 a month. This machine was touted as "a

new era in educational computing", and it marked a change in DEC marketing, recognizing that computers were now inexpensive enough to put one on each desk.

The PDP-8/A, announced in May 1974, was an essential prerequisite to this change. This was announced as DEC's entry into the microprocessor arena, although the announcement was somewhat misleading. DEC did have a cooperative agreement with INTEL at the time, and they were in the process of developing an 8080 based 8-bit system, but the PDP-8/A was not based on a VLSI microprocessor.

The Intel 8080 was announced in July 1974, priced at \$360 in unit quantity. In the same month, the DEC Components Group offered the PDP-8/A CPU plus 1K of RAM at a price of \$572 in quantities of 100 for December delivery. In November, the Components Group advertising used the slogan "Unbundling the world's most popular minicomputer system" and advertised this configuration, now renamed the Kit 8/A, as "minicomputer power at microcomputer prices."

The PDP-8/A had a 1.5 microsecond memory cycle time, with a 12-bit add from memory taking 3 microseconds. In comparison, 8080 instructions required a minimum of 2 microseconds and an 8-bit add from memory took 3.5 microseconds, with a 16 bit add being considerably slower. The faster clock rates supported by later versions of this chip would quickly erase this margin, but initially, the PDP-8/A was quite competitive.

The PDP-8/A CPU was less expensive than the PDP-8/E CPU because, by using MSI chips and printed circuit boards half-again as large as the PDP-8/E boards, it was possible to pack a full PDP-8 CPU onto a single circuit card. The PDP-8/A wasn't designed for speed, though, so the PDP-8/E CPU, with its 1.2 to 1.4 microsecond memory cycle time, remained in production and was used in high-end PDP-8/A systems, where its slight speed advantage was useful.

The new larger PDP-8/A board format, combined with use of MSI technology, allowed the introduction of two-board 8K and 16K core memories instead of the 3 board 4K and 8K memory subsystems of the PDP-8/E, and it allowed the construction of a number of multipurpose I/O boards supporting common peripheral mixes on a single board.

By the time the MITS Altair hit the market, with a kit price of \$439 in March 1975, DEC's primary thrust in marketing the PDP-8 was towards the OEM market. Although it was still available to end users, DEC's end-user advertising was clearly focused on their 16-bit PDP-11 and their 36-bit DECsystem 20.

Joining the Microprocessor Revolution

In August 1976, DEC published an 8 page slick advertisement entitled the "Illustrated Guide to OEM Success". At this point, DEC was a major supplier of video terminals and DEC writers, and the PDP-8 was still a big seller, with annual sales of 10,000 systems a year and over 30,000 machines installed.

The PDP-8/A 100, a machine with a short backplane, sold for \$1835, while the 8/A 620, with a 20 slot backplane and a PDP-8/E CPU, was selling for \$3,950. The OS-8 operating system was offered for \$400, while the RTS/8 realtime operating system, very important in the OEM market, was offered for \$500.

DEC had worked cooperatively with Intel during the development of the 8080, and when it became clear that a PDP-8 on a chip was a real possibility, DEC cooperated with Intersil and later Harris in developing the 6100 and 6120 chips.

These first came to market in July 1977 with the DECstation or VT78. This was advertised as "a big computer system that's small enough for anyone", using a series of photos showing a small girl unpacking one. (These must have been faked, there's no way she could lift some of those parts!)

The basic VT78 was packaged in the same package as the VT52 terminal, but it had an Intersil 6100 CPU, 16K of MOS RAM, 2 serial ports and a diskette interface packed into the box. The machine was sold in a bundled configuration that included an RX01 dual 8-inch diskette drive mounted in a teacart that could support the terminal. The advertised price was \$7995, discounted to \$5436 in lots of 50 or more.

The VT78 was a full scale member of the PDP-8 family, able to run OS/78 (a somewhat arbitrary renaming of OS/8) and RTS/8, and it was advertised as supporting FORTRAN IV and BASIC. At this time, the standard OS/8 distribution also included the PAL8, SABR and RALF assemblers, PIP, the peripheral interchange program, the TECO and EDIT text editors, and an assortment of other utilities.

At the time of the VT78 introduction, DEC's PDP-8 was well estab-

lished as a small business machine. A September 1977 *Datamation* survey showed that the DEC DataSystem 310, a PDP-8/A with 16K 12-bit words of core and supporting the DIBOL programming language was a significant player in this growing market segment. It is clear that the VT78 was well positioned to take advantage of this.

Even in 1978, when microprocessor-based controllers were the obvious choice for most OEM applications, DEC was still listing 12-bit systems in their advertising for that market, although only in passing. Internally, DEC began using large numbers of 6100 and 6120 chips as peripheral controllers on devices for the larger PDP-11 and VAX families of computers, and presumably, others also used these chips, but documentation of this is difficult to find.

The Last Gasp

DEC's Word Processing Computer Systems Group, with the software product WPS-8, gave the PDP-8 family its last big market. The advertisements for this group began in February 1979, and they rarely mentioned the hardware or software being sold; instead, the emphasis was on "word processing solutions".

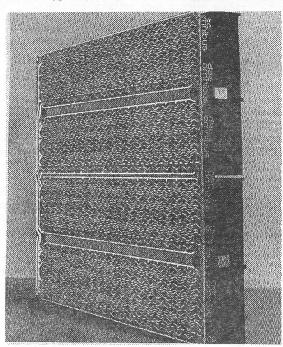
The word processing market of the early 1980's was large, and it was in turmoil, with many large businesses still using Selectric typewriters and manual methods, while others moved to mainframe or minicomputer based timesharing systems and yet others were trying microcomputer based systems. In this environment, a relatively mature product like WPS-8, supported on a microcomputer based workstation like the VT78 was a very reasonable choice.

The market was large enough that DEC followed up on the VT78 in 1980 with a new machine, the DECmate; this was based on the 6120 chip, pacaged in the same case as the ubiquitous VT100 terminal. As with the VT78, this was not an open system. It came with 32K words of RAM, an RX02 dual 8-inch diskette drive, and a printer port. The only options offered, other than variations in packaging, were a second dual diskette drive, a communications board, and an optional disk controller for DEC's RL02 rackmounted disk drives.

OS/78 was still being sold with the DECmate, and with a large disk such as the RL02, this was clearly a big enough system to handle the basic data processing needs of many small businesses.

Nonetheless, much of the market was made up of WPS users, and many DECmates were sold with a keyboard with special WPS keycaps instead of the normal ASCII markings used on the VT100.

In 1982, DEC came out with the DECmate II; although a closed architecture machine, this offered more options than the original DECmate, and it used RX50 5.25-inch diskette drives instead of the older 8-inch RX02 drives. This machine had support for an optional RX02 drive, allowing customers to convert older PDP-8 based documents to the new smaller diskette format, and 5, 10 and 20 megabyte MFM hard drives were available, typically using Seagate hard



PDP-8 OMNIBUS

ware.

At the time the DECmate II was introduced, there was a large installed base of small business systems based Z80 processors running CPM, and there was an emerging marked for systems compatible with the 8086 and MS/DOS. With the DECmate II, DEC offered support to both communities, using optional coprocessor boards.

The APU option allowed a Z80 and 64K of RAM to be added to a DECmate II, allowing full support for CPM. The XPU board option allowed for an 8086 and 512K of RAM. DEC's

MS/DOS environment used the PDP-8 compatible 6120 processor as a parallel I/O processor, allowing for very fast input-output, but unfortunately for DEC's market share, this made it incompatible with the IBM PC for applications that bypassed the BIOS and dealt directly with hardware.

Two years later, in 1984, DEC introduced the last of its PDP-8 compatible machines, the DECmate III. This machine remained in production until 1990, with almost all of the production going into the word processing market.

The PDP-8 Today

It has been 5 years since DEC stopped producing PDP-8 compatible

computer systems, but huge numbers are still in service, mostly in industrial control systems sold through OEMs. Today, PDP-8 systems control nuclear reactors, elevators, milling machines, and other automated equipment built from the late 1960's through the 1970's.

There are two or three companies selling spare parts and service for PDP-8 systems; the prices seem quite high for such apparently obsolete hardware, but if you imagine the problem from the point of view of, for example, a nuclear reactor operator, they make sense. It is far easier to maintain a old control system almost indefinitely, paying wildly inflated prices for spare parts, than it is to go through the com-

plex and even more expensive certification process required by the nuclear regulatory agencies for any significant change to such a system.

Alternately, consider the perspective of an automated machine tool owner. Should the PDP-8 CPU running the control system break, would you rather pay hundreds of dollars for a reconditioned but obsolete CPU, or tens of thousands of dollars for a new machine tool that uses a modern control system?

There are probably a number of WPS systems still in use, but these are almost certainly being thrown out at a high rate. PC and Mac based word processing systems are very good, and the

cost of converting to such a system is so low that there is little economic incentive to keep old systems that are incompatible with everything else on the market.

To date, old PDP-8 systems have not developed any special collectors market. When systems become available, they are frequently available to anyone willing to haul them away. Old DEC mounting racks, particularly those with casters, have a fair market value of between \$10 and \$40, but the electronics they contain rarely brings in more than a few dollars at surplus sales.

There are perhaps 100 active PDP-8 collectors, judging by the names that show up irregularly in the USENET newsgroup alt.sys.pdp8 and the pdp8-lovers@ai.mit.edu mailing list. Most of the machines held by this group of collectors are DECmates and various OMNIBUS machines such as the PDP-8/E and PDP-8/A, but there are a fair number of older PDP-8 systems in good working order.

The PDP-8/S is perhaps the least common PDP-8 CPU currently in the hands of collectors. With a production run of only 1024, there were never many, and because of its low speed, most were discarded quickly when faster models became available at lower prices. Some of the older PDP-8 peripherals are quite hard to find. TU56 DECtape drives are particularly rare, while RX01 and RX02 diskette drives are fairly commonplace.

For those who cannot find PDP-8 hardware, a number of good emulators are available. Most are available on the world-wide-web; a good starting point is http://www.cs.uiowa.edu/~jones/pdp8/. Another good starting point is the FTP archive maintained at sunsite.unc.edu; the directory path is a long one, /pub/academic/computer-science/history/pdp-8.

Sources

The dates cited here, particularly in the 1970's are all references to the month of publication of the press release or advertisement in *Datamation* magazine. This magazine is a good general source for press releases and computer advertising through the introduction of the PDP-8/A, but I have yet to find a good source to document the details of the DECmate era.

THE INTERNET

THE COMPUTER REVOLUTION PART II

"Bringing it all together"

By Walter Peterson, Technical Director, HCS

ou can't pick up a newspaper without reading something about it. Growth has been between 5 and 10% per month! The Internet has invaded the public conscience. Like the microcomputer that came before it, the Internet seems destined to touch every aspect of our lives. It seems obvious to us today, looking back, that microcomputers / microprocessors would revolutionize the way we live and do business. It was not always so. As late as 1977, some industry leaders declared that "people" would not want to own computers. An otherwise business savvy friend of mine declared that the Internet's popularity was "a flash in the pan". What does the future hold? The future has proven difficult, even impossible to predict. The following is an observation of someone who has been in the Internet business since about November of last year.

Computers found their first use by the military and the census bureau to calculate ballistic tables and tabulate the census. Universities would soon acquire these remarkable machines to aid in research. Large corporations soon discovered that computer could ease and speed many operations. The Internet began as a resource developed by the military, research centers and universities to communicate and collaborate on research. Large corporations soon discovered the benefits of being "on the net". Sound familiar? When microcomputers first appeared in 1975, the only people who purchased them were technical hobbyists who had used computers at universities and knew their power and versatility. People would have to assemble the computer from kits and program them in machine language.

When the Internet service providers, ISPs (companies that sell dial-up access to the Internet), began in 1992, the Internet was difficult to use. Users had to navigate the net from a UNIX text command prompt. The only people who had the knowledge or desire to use the service were people who had access to the Internet through universities.

In 1975, MITS commissioned a painting that showed people carrying "their" computers entitled "The Peoples' computer." Companies like the "Peoples' Computer Company" soon appeared. At a Hamfest in Miami in the winter of 1995, I saw a business card that referred to the Internet as "The People's Network".

The "Microcomputer Revolution" gave rise to a new business term "Hyper Growth." Many companies like Apple grew from garage operations to Fortune 500 companies in three years or less.

This last summer, a new company, Netscape, an Internet software company that had only existed for

only about 1 year, went public in a IPO that attracted the attention of Wall Street.

In 1981, the giant of computers IBM, entered the business and soon set the standard with the IBM PC. However soon other companies would follow the standard and the industry would become dominated by "clones". Last September, Microsoft entered the Internet business with Windows 95 and the MSN (Microsoft Network).

What does the future of the Internet hold? We seem to be at about the IBM PC stage with Internet businesses. If we follow the past, one would believe that the future belongs to the small local ISPs. The local ISP offers a much better value for the heavy on-line user. Flat rates for monthly access range from \$14 per month to \$30 per month.

One critical difference between this revolution and the one which came before, is that the last one was more or less self starting. Companies would get cash in advance to assemble the computers they sold. Now it takes several months of revenue to pay for expansion. Most ISPs have been struggling with growth rates that are almost impossible to manage and even harder to capitalize. The result has been that many ISPs have been plagued by customer support problems, oversales of services and reliability problems.

Another disturbing thing that I saw happen in the early eighties has happened again — people who take advantage of the hype and the public's ignorance in order to sell services such as Internet advertising at inflated prices. In 1982, I saw a lot of people get ripped off by people who promised that "computerizing" would solve all their problems. I saw several instances where dealers marked computer hardware up as much as 500%. Here come the Silicon Snake Oil salesmen again!

In the end I think that the consumer will win in this high tech rat race. The computer revolution has brought us many things that were impossible to predict. I am writing this essay on my own computer, and yet it's more powerful than computers costing millions of dollars that existed in 1975 when the microcomputer revolution began. Many of us own our own micro-supercomputers. What marvels will the second revolution bring? Only time will tell for sure.

Footnote: The friend I spoke of in the article who thought the Internet was "a flash in the pan" called me the other day. He had spent some time on the Internet. He was amazed at what he found. He is now pursuing doing business on the net with the fervor of the newly converted.

"What does the future of the Internet hold? We seem to be at about the IBM PC stage with Internet businesses. If we follow the past, one would believe that the future belongs to the small local ISPs."

FOR THE COLLECTOR

A REGULAR SERIES FOR THE ENTHUSIAST

"Not Just Hardware Collecting"

By Kevin Stumpf, Commercial Computing Museum Project

eople tend to focus their collecting activity on computers - entire systems. As I've said before, the computer industry is so large and there have been so many different makes and models of computers built that there's plenty of room for everybody who wants to collect'em. But, why only collect systems?

In the first installment of this column I tried to poke fun at me and other collectors by comparing our interests to people who collect lunch-boxes. Recently, I read a posting on the Internet from a person who collects cigar bands. Hmmm, now what can I do with that one? Only this, use it as a confirmation of the wonderful diversity humankind has been blessed with and use it as an encouragement to broaden our definition of what's worth collecting.

There are many things to collect. You can find things, other than systems, that are suited to your budgets, tastes, interests, and even the amount of storage space you have, and still feel connected with the field of computing. In fact, just think how monotonous life would be if everybody collected PDP-11's? Let's be as dynamic as this industry and "collect what no one has collected before."

OK then, how about collecting mouse pads? Mouse pads themselves aren't interesting; I mean the same rectangular shape, the same foam base, and a cloth cover, big deal, but what's on the cover makes them interesting. The artwork, colors, slogans and names printed on them make mouse pads very collectible.

The next item takes us back in time. Why not collect punched cards? All sorts of interesting stuff is printed on them. The name of the company or university name, field names, instructions, etc., etc. Also consider OMR (Optical Mark Recognition) cards.

Through the years, storage media has changed and the different varieties make for an interesting collection. Disks: platters, drive mechanisms (fixed / removable), floppies, different densities, sizes, makes and models. Tapes: paper, 9-track, VHS, cartridges, reels, cassettes, DAT, different makes and models. Wow, lots to lookout for. Don't forget strip technology: mag-stripe ledger cards, magcard, credit-cards, etc., etc.

Walls are an ideal place to display nameplates or faceplates, as they're often called. These official designators are usually on the exterior of a piece of hardware. They typically consist of a logo and the model number or name (Hey, do you find it difficult calling a computer an Aptiva or Multia instead of something like a 1401 or 11/45. Real computers don't have names!). Sometimes they are actual signs that were separate from the hardware, but are mounted on top of the unit. Sometimes they are separate molded pieces that attach to the hardware. Sometimes they're silk-screened to a cabinet. All the time they're a wonderful way to remember hardware too large to keep in the den.

In the annals of the history of computing, there first came the punched card, then came the keyboard, and now there are mouses. Well, we've already talked about punched cards so that leaves keyboards and mouses as candidate collectibles. Keyboards come in all shapes, sizes, colors, and key-arrangements. Mouses are fast breeders and now there are so many varieties that you can probably find one to suit your mood. Let's talk about paper for a while. Paper - remember that stuff? Under this heading we can group books, documentation, brochures, magazines, catalogs, and posters.

Collecting books is an old hobby so it shouldn't surprise anybody if you tell them you collect introductory data processing texts, or nonscience-fiction about computers, or books about information retrieval, whatever! The one nice thing about documentation is that every computer and peripheral had at least one manual so you should be able to dig up something. Documentation came in all shapes and sizes from colorful and distinctive binders to nifty pocket cards, and often you'll find black and white photographs of the product being described. Brochures are probably the most colorful and expressive artifact of the computer industry, and if you start now, they'll be easy to acquire. Magazines are also easy to acquire, so keep looking for premiere issues, special annual issues, and last issues. Catalogs give you a very complete picture of the industry. MicroAge started out with a huge, colorful catalog and, now with successful direct sales programs, every vendor publishes a hefty one. Posters are artsy reminders of the past;

There are many things to collect. You can find things, other than systems, that are suited to your budgets, tastes, interests, and even the amount of storage space you have, and still feel connected with the field of computing."

are easy to store; and are fairly easy to acquire.

Books are nice, but we live in a visual society so don't forget films. Computer companies have always had to sell concepts so they've always produced promotional films. You can find 16mm films and material on VHS. The most recent manifestation of this medium is the infomercial. Also worth collecting is drama and science-fiction. The sci-fi stuff is obvious, but did you know there's a great scene in the movie *Charley* with an IBM 360 system? Or how about that early Tracey and Hepburn flick? Go look for'em, it's fun.

If you've ever gone to a seminar or product briefing / announcement, you

probably received a handy folder. These things are hard to describe, but what I mean are the stiff, typically plastic folder with a slot or clip to hold a pad of paper on one side and a sleeve to hold papers in the other. These useful give-aways usually have the name of the event and date or least the name of the sponsor printed on the cover.

A related item is the carrying bag or case. They are especially popular at tradeshows. They started out as paper, then changed to plastic, and are now just like sports equipment bags. Go for it!

We shouldn't skip over pens. Every company produces pens every time they announce a new product or program.

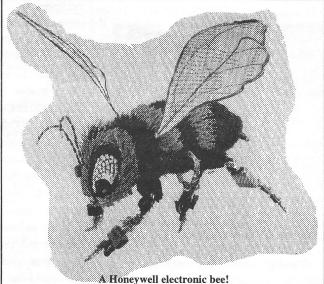
Pin-on buttons have always been popular. Even people outside the computer biz collect them. Some are outrageous, most are humorous, and all are colorful.

What about clothing? A product launch without T-shirts seem to be illegal. And, even though T-shirts are very much a part of every programmers and presidents formal attire, you will also find jackets, windbreakers, polo-shirts, ties, and, of course, pocket protectors. Corporate ties have also been around a long time, but pocket-protectors are a real prize.

Let's return to some of the more techie-type stuff. How about control pan-

els and consoles? That's how I got started. I'll spend an entire column on them sometime. Often the nameplate is part of the panel. Large systems also had desk-like consoles in addition to large control panels. This is perhaps the silliest idea, but how about push buttons? Yeap, good'ole push buttons. Each company tended to have their own distinctive design, colors, and vernacular. For instance, the buttons on early Honeywell systems had symbols instead of words.

This next idea is perhaps selfserving because sooner or later any old systems you might have will require servicing so why not collect service kits? Not just the one you'll need for your particular system, but kits in general. The



tools changed with the technology so its another interesting way to map technology. You know though, I could never figure out how service reps fit the proverbial 2 by 4 in those small cases. You know, its the one they would wack the computer with when all else failed.

Warning: only read this idea if you're a devout techie. Collect wire. Specifically collect different types of wire, cabling, connectors. A Centronics printer cable isn't much to look at, but a 4 kilo (10 pound) electrical coupler from an IBM 360 CPU is something to behold. Each technology from each manufacturer had it's own type of cabling and connectors.

Now we're into relatively modern ideas. Collecting semiconductors and

microprocessors can keep you busy for a long time. Everybody knows about Intel, but they're not the only, nor were they the only company to make microprocessors. Even though the semiconductor industry is younger than the computer industry, it's produced many more product types and varieties than the computer biz.

Also of interest is the way electronic circuits were packaged. It started with vacuum tubes at one circuit per 4 square inches to 500,000 circuits per quarter inch. Plug-in cards with handles, motherboards, backplanes, etc. Something for the real electronics enthusiast.

So far the focus has been on hardware. What about software? Don't forget, software didn't start with Lotus 1-

2-3. You could collect COBOL object decks (80-column punch cards), move up to punched papertape, then onto the bright red boxes Novell Netware used to be delivered in. There's an opportunity to choose a particular application area, say word processing for instance, and you could also separate your collection between demo software and the real thing.

Hopefully I've saved the best for last. Everybody loves novelties and there sure are lots of them to choose from. You can get clocks in the shape of equipment, bottleopener keyboards, CRT-like paperclip holders, frisbees, clocks faces made from disk

platters, rulers, puzzles, pencil sharpeners in CPU's, and lots more. Honeywell even hired artists to make statues of animals out of discards electronic components. They were real neat.

Well I'm done; please tell me what I missed. Not everybody can and should collect systems, but I believe every system collector wants theirs to be authentic (operating systems and application software, manuals, etc.) so by specializing, you could be in a position to help somebody complete their own collections.

Please let me know how you got your collection started and tips for new collectors.

THE ATARI 8-BIT

THE BEST 8-BIT MICRO? Member Story

By Christopher Friend

etween 1977 and 1990, Atari released a number of 8-bit computer systems. These ranged from computers with a TV hookup and 16K RAM to computers with Bus Interfaces, Monitor connections, and 128K RAM. These computers all offered superior sound, graphics, and speed comparable to the Apple II and Commodore

The Atari 400

The Atari was the first computer to offer "Plug and Play" operation. It had a Serial I/O that could handle four disk drives, a printer, a cassette drive, a modem, and many other devices such as speech synthesizers. The Atari's data bus also operated at 10-20 times the speed of the Apple II's and the Commodore's. The Commodore had similar plug and play operation, but had different slots for modems and cassette drives. The Apple, on the other hand, only had a monitor hookup and a cassette hookup. If you wanted anything else you needed to buy a \$50-\$100 card to plug into the computer.

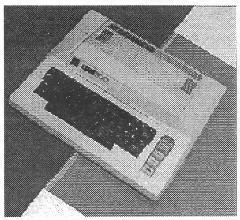
Atari was the first company to offer a machine with expandable memory (At least memory that was expandable by the user). This was the Atari 800. It came with 1 or 2 16K banks of RAM installed. If the user needed to, he or she could add

more RAM cards. Cards were originally sold in 8K or 16K modules, but later in 32K and 64K modules.

The Atari had better sound than the Apple and Commodore. The Atari had a 4-voice chip called the POKEY. The Commodore had a 3-voice synthesizer chip called the SYD. The Apple had an internal speaker with enough hardware for 2 channel operation.

The Atari's graphics were also superior. The Atari had Player Missile graphics capabilities and the ability to use Display Lists making it possible to have more than one graphic mode on the screen at once. The Atari's highest graphics mode is 320x192x2 Colors. The Commodore had 240x144x16 Colors using a special mixing technique. Each computer had a total palette of 256 colors (8 colors x 8 shades).

As you can see, the Atari does have its down sides, but no other 8-bit computer has lasted for over 6 years without its industrial mother. New software and magazines continue to flow. GEnie and CompuServe both have very active areas. The magazines, software and active areas on-line show that Atari 8-bitters are fanatics and that the computer will last as long as the enthusiasm lasts.



The Atari 800

first company to offer a machine with expandable memory (At least memory that was expandable by the user). This was the Atari 800." "As you can see, the Atari does have its down sides, but no other 8-bit computer has lasted for over 6 years without its industrial mother."

"Atari was the

THE BEGINNINGS

I OWNED MY FIRST COMPUTER FOR ABOUT FOUR HOURS Member Story

By Gil Parrish

I didn't get a computer during my years of college (1972-1976) either, although my university was the proud owner of a multi-million dollar IBM mainframe, due to a generous donation from IBM itself. The mainframe was (naturally) off-limits to mere students, and as close as most of us ever got to it were "computer rooms" scattered around campus that actually contained NO computers, but instead, computer terminals. And the terminals were, for the most part, what were called "teleprinters" or "teletypes". You sat in front of a typewriterlike arrangement, with keys in front and paper in back, and what you keyed into the terminal was printed at the same time. Once you pressed ENTER, the computer would respond to your command, and would have your teleprinter type the response on the same sheet of continuous paper, just below your entry. The computer rooms usually had a video display terminal or two, but those were very new technology and not in common use.

I did not take any computer classes in college. I started one, and got my first taste of a

y initial brush with computers had occurred long before this, mind you. My high school had a "minimester" program that sent us eager students to work with various employers around town for the month of January, 1972, and I got sent to the then-new American Airlines computer center in Tulsa. Payroll and other matters were handled with punchcards remember those? They were a bit larger than a dollar bill, made of heavy paper (almost cardboard consistency), and run through machines called "keypunches" which punched out small rectangular holes which represented names, dollar amounts, and so forth. (That's why some old-timers still call "data-entry" jobs "keypunching".) Needless to say, there was an enormous amount of sorting to do when you accumulated stacks of these cards, and large, noisy machines did the reading and sorting. Care to guess what happened when Yours Truly, as the new kid on the block, inserted a stack of cards into a sorter without making sure the stack was ABSOLUTELY EVEN on each side? You could (and I did) shred up a lot of cards fast that way, and then it was back to the keypunches to recreate the

BASIC-like programming language called BRUIN; but, the course moved far beyond my comprehension in the first few days, and I promptly dropped it for something else. Still, I have fond memories of that college system because my "computer-jock" roommate let me know there was an excellent game available on it by the name of "Star Trek". In fact, he sat me down at a teleprinter, logged me on and started the game for me. There were no "on-line" instructions; I was just sort of dropped into the role of Captain of the Enterprise, and the teleprinter sat there, waiting for orders. I thought back to the old TV series and tried out whatever commands I could recall. Sensors? The computer obligingly printed out a little square grid of periods, with the periods replaced in one spot by an "X" (which I assumed was my location), and in another place with an asterisk. Shields? The computer asked how much power I wished to give the shields; I just picked a numeral (since I had no idea how much power was available) and the computer seemed to accept it. Photon torpedoes? The computer asked the direction of the object I wanted to shoot; I gave the heading to the asterisk and fired, but not much happened. (I later found out I was shooting at a star, logically enough; there didn't happen to be any Klingons in my sector.) I gave up at that point, but I was clearly into something with possibilities far beyond what I had experienced in board games and other entertainments of the time. I subsequently found written documentation for Star Trek on reserve at the library (quite a thick manual, actually) and learned what I was supposed to be doing: defending my quadrant sector by sector by blowing up those nasty Klingons with phasers or photon torpedoes. Basically, you'd run a long range scan to determine where the Klingons were in all sectors surrounding your present location, raise your shields, warp to an occupied sector, do a short range scan to pinpoint the exact enemy location (which wasn't always easy, especially if a Klingon ship happened to be using a Romulan cloaking device), duke it out, and (assuming you survived, particularly in those sectors which contained more than one Klingon ship) warping to the next occupied sector for more battles — or the nearest Starbase for repairs and supplies. All of this was

On one occasion, while playing in a computer room located in the college's science library, I didn't even notice when the library closed down for the evening: the janitor, who found me some time later, still playing, had to unlock the door to let me out"

done by text only (unless you wish to call those sensor-scan grids "graphics"). Playing Star Trek (and running all those sensor scans) on a teleprinter tended to waste a tremendous amount of the college's paper — but it was quite a game, and over holidays (when most of the computer terminals sat vacant) I'd sit at the teleprinter for hours at a time. On one occasion, while playing in a computer room located in the college's science library, I didn't even notice when the library closed down for the evening; the janitor, who found me some time later, still playing, had to unlock the door to let me out.

No. While all this wetted my appetite for computing, I didn't purchase my very own computer until some time in late '83 / early '84, when a local appliance merchant was closing out Atari 400's for \$99. I thought the price tag was just too low to pass up, so without any additional research I pulled out the trusty charge card and bought a unit then and there. My own computer!

Now, I wasn't a complete boob. I knew enough about home computers to understand that the 400 had limitations like the flat-panel keyboard and just 16K memory. But I didn't intend to do anything serious on it like word processing, and I thought the system would be fine for letting me learn BASIC and run a few programs. At that time, the Atari Computer Exchange was still up and running, and that offered simple and inexpensive user-developed software commercially, much of that on tape. All I had to do was buy a tape drive and I was set to go — I thought.

I went home, got the unit out, hooked it up, and turned it on. It came up with the message, "MEMO PAD". I typed some characters; they appeared on the screen; I pressed RETURN; the cursor moved down a line.... What was all this? Even my little BRUIN / BASIC training told me something was wrong; I ought to have at least gotten an error message or something.

I then learned, in rapid succession, that (a) the 400 didn't have built-in BASIC, (b) BASIC was available on a plug-in cartridge, (c) there was only one place in town that carried the cartridge (or much of any other Atari hardware and

software), and (d) those folks wanted 50 bucks for BASIC. Needless to say, the economics of buying this "cheap" 400 were shifting right there under my feet, since lots of other computer models available at that time (such as the Commodore 64, not to mention Atari's own 600XL and 800XL) had built-in BASIC, better keyboards, and (in some cases) more memory, for not all that much more money. So the 400 went back in the box, back to the appliance store, and back on the shelf after I walked away with a refund. Elapsed time, about 4 hours.

In hindsight, this was all probably just as well. I now own an Atari 400, and if I wasn't completely knowledgeable about its many limitations then, I am fully aware of them now. Besides, the Atari Computer Exchange collapsed not long

afterwards, and the "only merchant in town" with Atari stuff closed its doors at about the same time. While I might have been delighted with the 400 had I bought the BASIC cartridge and soldiered on (I'm sure many users were), I might also have felt considerable frustration at its lack of capabilities, concluded that home computers were a "rip-off", and never gotten back into them. Even as it was, this "near miss" kept me in a state of indecision for several years. It was only around 1987 that I began down the path that has lead me to accumulating all sorts of Commodore, Atari, Timex/Sinclair, CP/M, Coleco ADAM, Apple II, TRS-80, TI, and other computer units, starting after I "inherited" a Commodore C-16 (not C-64) from my own son. But that's another story.



A CompUSA Museum?!

You bet! In Dallas, Texas at the CompUSA flagship store. An 8 foot wall case was set aside to show off a few of the classic computers and let people know just how far we've come. (Part of the hidden message is that "only CompUSA knows enough about computing to show you this." Most of the materials inside came from my personal collection, and it was an interesting job to winnow down the materials to tell the story of personal computing "in four easy lessons," as the sign says. You can't see everything from the photo, but in addition to the four pieces of hardware on the pedestals (a 1920s' Comptometer, a Commodore PET (since replaced by the Altair), an original IBM PC and original Mac) there are a bunch of interesting documents and smaller items against the backdrop. These include core memory, a slide rule, the first model Casio calculator, DOS 1.0, Windows 1.0, an 8" diskette, a mouse from a Xerox Star, and facsimiles of some of the milestone computer books and magazines. We squeezed a lot into 64 square feet!

Thank You! - to Larry Groebe, CompUSA employee, member and a great help to HCS.

REMEMBERING GARY KILDALL

AN INTERESTING FORK IN THE ROAD TO MS-DOS Or "A Funny Thing Happened on the Way to Fame and Fortune."

By Gregory Resch

n the cold world of computers, the random events of life play their pivotal role - perhaps even more so, because of the many small and discrete events, scheduled and unscheduled, that occur among competing technologies, rapid developments, and strong personalities.

But, we sometimes overlook those quirks of fate just as readily as we ignore subtle warnings that our lives are about to change forever. Careers, fame, advances in technology that we tend to take for granted often result as much from flukes of fate as do the pivotal battles, mass-migrations, and other social upheavals in other arenas of history: the accidentally-intercepted Zimmermann telegram, the distrusted radar warnings before the attack on Pearl Harbor, General McClellan's discovery of the entire Confederate battle-plan before Antietam all watersheds in history that, but for a minor twist of fate, could just as easily have resulted in completely different courses for the lives of many men then living, and many yet to be born.

The story has been told many times, in different ways, for different purposes: how, when IBM was looking for someone to write an operating system for their new, almost (for IBM) experimental microcomputer, the already-famous developer of the CP/M operating-system lost a chance to become an even bigger player in the "microcomputer explosion."

It's especially appropriate to re-tell the story now, even acknowledging the mythical aspects, first as an important "history lesson" for readers of Historically Brewed who haven't heard it before, secondly as an example of the far-reaching consequences that can flow from one simple incident, and finally as a timely tribute to a man who deserves a place in the pantheon of microcomputer pioneers. In 1980, International Business Machines

er." Their new design for this very intelligent

Corporation was methodically developing their second design of what we now call a "microcomputterminal would take advantage of a 16-bit-addressing microprocessor, the Intel 8088. Among the operating systems IBM was considering for their new model 5151 was CP/M-86, 16-bit version of the then-widely-used CP/M developed by Gary

Kildall of Digital Research, Incorporated.

But IBM was also looking at another possibility, a system offered by the company that had already written IBM's BASIC interpreter. The small company, consisting primarily of two selftaught hackers, had an agreement with an even smaller company, Seattle Computer Company, for the rights to "SC-86," an operating system written specifically for the instruction-set of the Intel 8086. The two young business neophytes had no real idea what they were going to do with SC-86; they just thought it might come in handy. Eventually, it did.

For the IBM-types' rather hasty trip to the West coast (understood by true-Blue easterners to lie somewhere west of Cleveland), they had arranged first to visit Kildall at his Digital Research headquarters in Monterey, California; then go on to meet those two young hot-shots up in for-goshsakes Washington state.

The meeting at Digital Research did not go well. East Coast thinking versus West Coast thinking... suits versus short sleeves... businesslike New York style versus laid-back informality. This was definitely not a "marriage made in heaven." Early in the game — er, meeting — the IBM reps displayed a non-disclosure-agreement form for Kildall's signature, a type of agreement customary not only in IBM's own way of doing business, but throughout the computer industry — the computer industry, that is, that lived east of the Rockies.

Kildall, legend has it, bristled. Officious business arrangements, formal restrictive contracts, hard-ball dealings — these were simply not his style, nor the style in the burgeoning microcomputer industry of the West. The computer community that he knew had flourished *because* of a lack of such restrictions, *because* everyone tended to be open, *because* many programmers shared the results of their labors.

The DRI people — Kildall, his businesspartner wife, and his lawyer - huddled. Kildall and his colleagues had no real assurance that IBM was actually developing a serious product. After all, IBM was known for room-sized computers, not desktop-sized ones. Why should DRI let themselves be hassled by the East Coast minions of the past, when the real future of computers was being

The story has been told many times, in different ways, for different purposes:

HCS recognizes Gary Kildall as an impressive pioneer who gave the infant personal computer industry it's first direction. Long-live CP/M!



Gary Kildall

writ large along the Pacific coast?

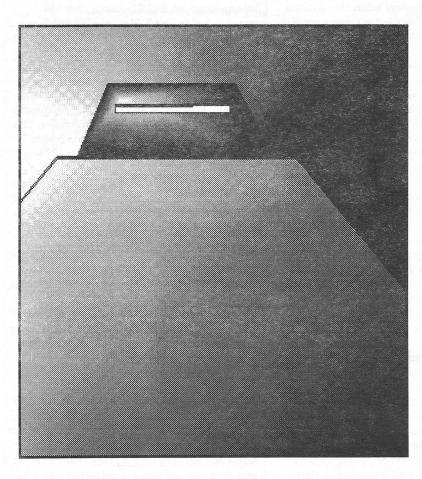
Finally they returned to the IBM "suits," offering DRI's own brand of non-disclosure agreement. It was IBM's turn to bristle; people just didn't treat the world's largest computer company that way!

The meeting collapsed. Kildall, one version of the story goes, left for the airport to fly his sailplane the rest of the day. The IBM reps headed for the airport, too, not to fly sailplanes but on to their second option and — they hoped — an agreement with the two young BASIC experts up in Washington, two guys named Bill Gates and Paul Allen, doing business as the Microsoft Corporation, who just happened to have the rights to a genuine 8086-oriented operating system.

Months later, in August, 1981, IBM announced their new "Personal Computer" and its all-new operating system, MS-DOS 1.0 by Microsoft. (IBM had negotiated the right to call it "PC-DOS.") The world took note, then moved on to give its attention to other things, which seemed a lot more important at the time.

In the summer of 1994, ironically at the beginning of the very week that would see Bill Gates, the single most influential developer in the microcomputer world, negotiate a desperate settlement with the U.S. Department of Justice to head off an anti-trust suit charging Microsoft with hegemony in the micro-computer software industry — at the very beginning of that week of huge consequence, Gary Kildall — born in Seattle, developer of PL/M, CP/M, CP/M-86, GEM (platform for the hugely successful Ventura Publisher; did he perhaps want to call it "GE/M" instead?), Concurrent DOS, and finally DR-DOS — passed away suddenly after an accidental fall in his home. So if you are the owner of a Dynabyte Monarch, or a Kaypro I, or perhaps one of Zenith's shiny, hit-it-big Z-100's, take a look in on it sometime in the quiet hours of the night, and see if perhaps you can't hear a tiny, silicon-based whimper coming from it — as one era in the fascinating age of microcomputers comes to an end.

Author's bio: Greg Resch stumbled into the world of computers when they were called "systems" and hackers were called "systems analysts." His knowledge of computers grew as rapidly as their size shrank, until now he knows quite a lot about very little. He can, however, be reached by e-mail at: resch@cpcug.org. Copyright 1994-1995, Gregory Resch.



"I speak of none other but the computer that is to come after me.

A computer who's nearest operational parameters, I am not worthy to calculate.

Yet, I will design it for you.

A computer which can calculate the answer to the ultimate question.

A computer with such infinite and subtle complexity — that organic life itself shall form part of its operational matrix."

A quote from "Deep Thought", the computer in

The Hitchhiker's Guide to the Galaxy.

If you haven't checked out the book or movie you should! It's one of my favorites. -DG

HOME ARCADE ENTHUSIAST

COLLECTABLE MACHINES OF COMPUTER HISTORY Regular Feature

By Larry Anderson

s many of you are already aware, many folks regard collectors of obscure electronics as eccentrics. I've lost track of all of the times that I've been digging through a stack of games at the flea market, and someone will come up to me and ask, "Why in the world would anyone want THOSE stupid old games?" The more I hear that question, the more I wonder if there is a good answer for it; I've come to the conclusion that there is not one good answer, but several. In this article, I'd like to share with you some of the reasons that I became a classic video games collector, and share some of my exploits with you.

Fond childhood memories are a driving force behind my collection; ever since the first Space Invaders was installed in my favorite bowling alley, I've been a "Joystick Jockey". When Atari came out with the 2600 VCS, I begged and begged my parents to get one for me. Sure enough, that christmas, there it was under the tree with 10 games to go with it. I wasted many hours in front of my TV trying to beat the latest Asteroids record, or cruising through the jungle with Pitfall Harry. Today as a collector, I have a set of games that would've made me the most popular kid on the block. It's also kinda neat walking through the flea market with a box full of old game systems, and having kids come up to you checking everything out. A lot of people tell me that kids today have no appreciation for the history behind their Sega Genesis' and their Super Nintendos; try telling that

to the next door neighbor's kids who come over

Football!

every weekend for a ritual bout at Intellivision NFL

History is a very important reason why I collect; people appreciate the technology of today more when they understand the stumbling blocks of the past, and video games are no exception. The Atari VCS uses a 6507 CPU (basically a 6502 with a lobotomy), and has 128 BYTES of RAM. The average game was written using 4K ROMS; if the programmer was talented, he could implement bank-switching routines and boost the total to 8K. Primitive by the standards of today's routinely 1 megabyte and up games, yet the technology for today wouldn't be here if someone hadn't started experimenting with the basics. People are also an important part of this equation; people like Nolan Bushnell (who is often credited as the father of video gaming), and Jay Miner (the principal designer behind some of the Atari 2600's key processors) were pioneers of an industry that exploded into a multi-million dollar a year business for many companies.

When asked why I enjoy playing games on classic systems so much, I often answer that the games of today don't approach the level of playability that yesterday's simplistic games do. Personally, I can't stand to play Sonic The Hedgehog for more than an hour with getting a headache; yet I can play a game of Tron Deadly Disks for the Intellivision for twice as long without boredom. Unfortunately, playability was one of the factors that led to the "great video game crash of 1984". There were simply too many bad games on the market, and the average shopper turned his or her attention to the home computer for their children's gaming needs. Even with all of today's "blast processing", "850 million pixel per second rendering", the basic factor, the game, hasn't improved any; in this writer's opinion, it's gone downhill.

In the end, why one collects is greatly a matter of one's personal tastes. I hope that some of the reasons I've shared with you echo some of the sentiments you hold regarding old computers. There's nothing quite like digging through a stack of clothes and old toys, finding something super rare and cool, and paying next to nothing for it. Of course as collectors we often find the opposite is true, but we take the good with the bad. My personal favorite gem is a prototype of 5200 Battlezone that I found at a thrift store for 50 cents, I'm sure the rest of you have similar stories. I also hope that in some small way I'm helping to preserve the history of an industry that has endured and will continue to evolve well into the next century.

Atari and Coleco spent many millions of dollars in legal fees over what was one of the industries' first courtroom battles over patent infringement. Official accounts are sketchy, but fortunately for me, I have information gleaned from a source that worked inside Atari during these proceedings. Next issue I will be discussing the lawsuit in depth, what each company had at stake, and also show you some rare photographs of the actual exhibits used in the case.

Meanwhile, happy gaming {(or computing =)}, and if you have any comments or suggestions for future articles, let me know what they are!! My Internet e-mail address is larry_a@netcom.com

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CLASSIC ARCADES

COLLECTABLE MACHINES OF COMPUTER HISTORY New Feature

By Duncan Brown

Having owned and played real

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Why bother with

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i, I've been invited to write a column for this wonderful little magazine. My area of expertise is classic arcade games, but I've also had a fair number of PDP-11's and such pass through my infamous basement, so I think I'll fit right in with this group. I thought I'd start off with a quick recap of some stuff I've done throughout the years, to give you an idea of the kinds of subjects I'll be writing about in future articles.

Since about the age of 8, I've been a pinball fanatic. We can thank my dad for introducing me to those "tools of the devil" (well, that's what his mom always referred to them as...) When we would visit his parents in Tallahassee, we'd sneak out to this great arcade, where we would play games like Fireball (just

another new game back then!) My grandmother's theory on the satanic

nature of arcade games was borne out when I dropped out of college after two years to open my own arcade (with three other UVA dropouts!) In the time before I dropped out, I worked for a local arcade, became Asteroids world high score holder for six months, designed my own pinball machine, reverse-engineered Asteroids some... and even occasionally

attended classes!

The four of us ran our arcade / sandwich shop for three and a half years, before finally throwing in the towel. We had borrowed every penny to start the place, and had never quite gotten ahead of the

bill-paying curve. Part of the problem was we sold the food cheap to bring in game customers, and sold the games cheap to bring in food customers... and tried to make it up on volume. Needless to say we had a very

loyal customer base, all of whom were sorry to see us

While I ran the arcade, I did a lot more reverse-engineering on Asteroids, and also on a few other games. For instance, I made a whole new set of 16 "tube" shapes for that classic game Tempest (which was still new at the time.) I even went so far as to write an entire new game from scratch for the Williams game hardware of the Stargate / Joust / Robotron era. It was called Alien Arena... and in retrospect just wasn't that good a game.... but I sure had a lot of fun with it. Some of our customers actually enjoyed it. I suspect they just didn't get out much.

I actually ended up putting that Asteroids knowledge to good use eventually. I worked with a psychology researcher at the University of Denver, who used a modified Asteroids game in the study of "complex skill acquisition." I set it up so that he could vary all sorts of parameters on the fly, log the game data as it was played, and even "replay" that data back to the screen again to watch subjects' performance in

full speed or stop-motion.

After the fall of the arcade, I got a real job: I went to work for Comdial, a telephone manufacturer

Comdial "Voice Express" telephone (Rev C or higher), I wrote the firmware for it! It uses a very versatile little 6805 microcontroller.

Then I became a VAX system manager, first for six years at one firm in town, and for the last six months at GE Fanuc, an industrial automation controller manufacturer also in Charlottesville. VAXes are fun, but they aren't arcade games. Have no fear, I've never quite cut my ties to games, and in fact have renewed my interest in them in the last couple of

I never gave up my prize rare game from the arcade (I, Robot by Atari), and in fact picked up a second one at the time as a "hot spare" since I knew I'd never be able to get spare parts. I also had an old electromechanical pinball machine I'd bought a few years ago. And of course, pack rat that I am, I had kept a huge stash of new and used parts that I had accumulated while owning the arcade. In the last year or two, I have been rapidly expanding my collection of games. I had kept up my contacts with fellow game 'operators" in the area, and as some of these classic games became their trash, I seized the opportunity to make them my treasure.

Somewhere along the line I discovered the rec.games.video.arcade.collecting newsgroup, which has just served to feed my bizarre obsession with this hobby. I have a lot to offer the newsgroup in terms of knowledge of games that are now classics, and their interest in this subject has renewed my interest in it. Finally, after all this time, people who can appreciate what had always seemed like a big waste of a large portion of my life. Just when I was making a normal life for myself again, here's a support group that can help me rationalize all that previously wasted time, and in fact spur me on to waste more! Isn't the internet wonderful?

Having owned and played real arcade games for so long, I had never had any interest in the home video game equipment. Why bother with low resolution, several-color games when there's an I, Robot or an Asteroids around? But, the specs on the new Atari Jaguar caught my eye, and I bought one for my son for last Christmas. (Yes, really it was for my son, honest!) I was so impressed by what the hardware could do, I decided I wanted to write games for it.

It really is nice to find an appreciative audience, even if it is a decade after much of this occurred. If you have feedback on this or any column, or things you'd like to see in future columns, or even if you just want to shoot the breeze about classic games, feel free to write me at db@cho000.cho.ge.com. I usually read news from an account on a DECUS machine, so you might also see posts from me under the account name brown_du@eisner.decus.org.

Until next month, remember: Avoid Spikes!

here in Charlottesville, VA. If you have ever seen a

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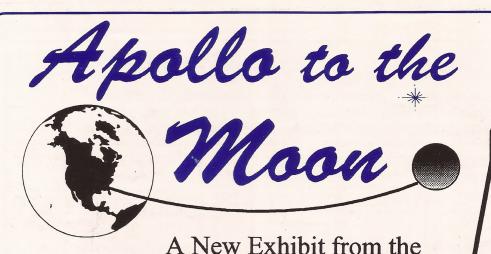
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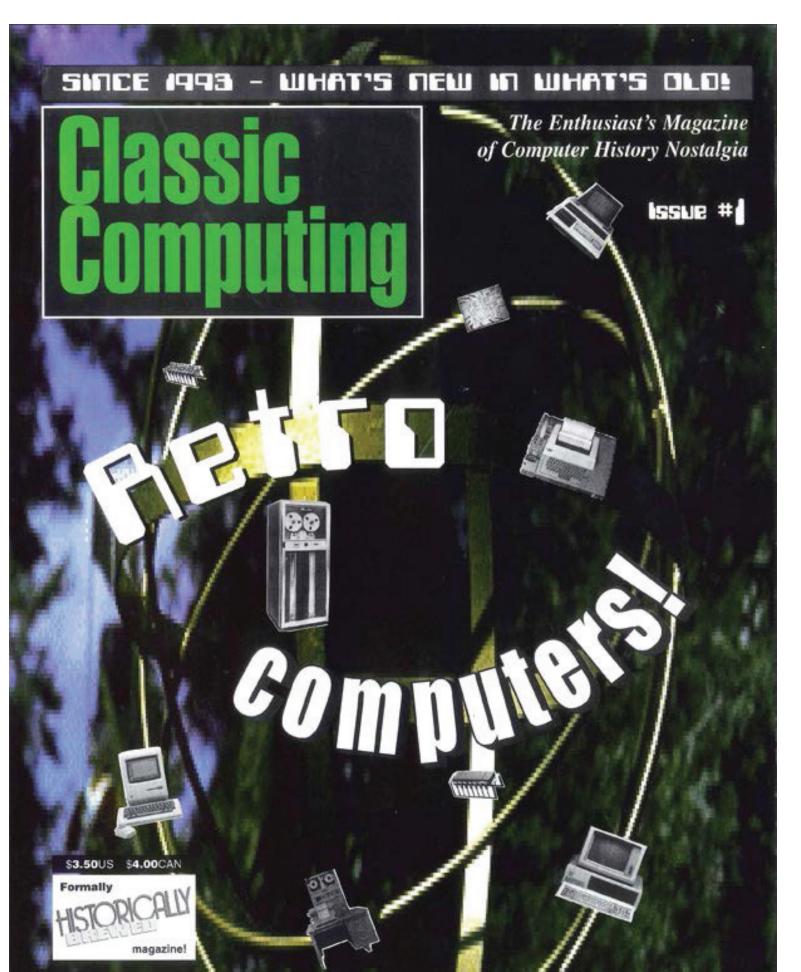
The world renowned American Computer Museum is celebrating the 25th anniversary of the Apollo missions to the Moon. Trace over 4,000 years of navigation and computing technologies that led to the first man on the moon. You will see hundreds of historical computing devices from the abacus, early mechanical, electrical and electronic calculators and computers through today's microchip. Original Apollo mission hardware from the Smithsonian is on display including a watch worn on the Moon, lunar tools, an Apollo command module guidance computer, autographed Apollo astronaut memorabilia and displays on space spin-offs. Where were you on July 20th, 1969? If you remember the day - you'll never forget the place! Relive your memories or share them with your family at this ideal family destination! Experience this unique computer history museum as seen in the New Yorker Magazine, the New York Times, PC Week, QST Magazine, etc...

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Classic Computing

(formally *Historically Brewed*)

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From the Publisher

After all these years . . .

By David Greelish

Wow! I finally did it - I finished Classic Computing magazine, issue 1! Welcome to the first, and last issue of the magazine of computer history nostalgia (that almost never was). It's missing the letters section, ads, Trading Post, "Friends," as well as a few other things, but I think it still has the soul of what Historically Brewed was. This essentially would have been HB issue 10. I had decided a name change was in order so that anyone could immediately know what the magazine was about. The covers were printed around 1998 and cost \$500! They were my first full-color ones. That pretty much "broke the bank" and stopped my magazine publishing days permanently (I'm keeping this short, so read the full story in my book). I have had the covers boxed up for 14 years until now. The articles here were all submitted to me around that time too ('97 - '98) and my wife and I did a preliminary layout in my QuarkXpress software for the Macintosh.

* Unfortunately, bylines had not been assigned yet for two articles, so now years later, I no longer have their original files, or authors. They were in the issue and stay in the issue. It would be cool if I hear from one of them in the future. They might just get a kick out of knowing that their writing finally got published!

I hope you enjoy the stories. Having now reread them all again during layout and editing, I have to say that they are all very good! Drop me a line please, let me know what you think. I will publish them on my blog.

David Greelish, Computer Historian President, Atlanta Historical Computing Society

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Collecting Classic Computers

The Hobby Goes Mainstream

By Kevin Stumpf

These are exciting times for established and would-be computer collectors. Fears have been proven unnecessary, that all of the good, big or little, old computers have long since been destroyed. Claims have also been proven incorrect that the skills and knowledge to repair and restore old computers have been lost. There is still plenty of everything for everyone.

The computer field is already over fifty years old now, but in the grand scheme of things, that is quite young, too young for many "end ofs" to creep into its vocabulary. This is just the beginning. If you started collecting today, you can easily build a collection and enjoy the hobby just as much as someone who started ten years ago.

Even the gender breakdown is shifting. When, in 1984, I started collecting computers, any collectors I knew or knew of, were also males. By 1998, when I wrote and published *A Guide to Collecting Computers and Computer Collectibles: History, Practice, and Technique*, I had met two women who admitted to collecting computers. Today, I know three female computer collectors.

Much has happened, much is happening, and there is still much, much more to happen. This article is a quick introduction for the would-be collector and a status report for the established collector.

Brief History of the Hobby

Collecting computers became popular with the advent of microcom-

puters (desktops, laptops, etc.), and that makes sense. Microcomputers are physically small and relatively inexpensive, making them easy to collect. This also made them appealing to would-be collectors, but these aren't the only qualities that explain the sudden surge in the number of computer collectors.

Microcomputers brought computing to the people, and many people found they liked it. The pleasure of personal computing increased computer literacy and the number of would-be collectors. Just like the IBM PC was the boost the industry needed, so microcomputing in general was the boost the hobby of collecting computers needed.

The first known collector started his collection in 1966 with a 120,000kg (about 24,000lb) behemoth. That collector was Claude Kagan, and he worked at Bell Labs in New Jersey. When his employer decided to replace their Burroughs 205, Claude acquired it and had it installed in a barn (remember, computers needed lots of space back then and generated lots of heat, so a barn was an ideal place to keep it). Many people around the world must have been accumulating mementos of the computer revolution, but nothing like Claude's effort stands out again until a year later in 1967. When then, Gwen and Gordon Bell officially announced The Computer Museum in Boston, Massachusetts.

Private collections started in earnest, but it wasn't until 1993 that it was recognized as a hobby when David Greelish published the first issue of a newsletter he called *Historically Brewed*

Much has happened, much is happening, and there is still much, much more to happen. This article is a quick introduction for the wouldbe collector and a status report for the established collector. under an organization called the Historical Computer Society. That same year, Dr. Thomas Haddock published a price and rarity guide called *A Collector's Guide to Personal Computers and Pocket Calculators*. Both publications were ahead of their time, but they helped galvanize the hobby - some people became computer collectors.

In 1996, Bill Whitson opened a list server on the Internet called the Classic Computers List. It is still serving a very active community of collectors from around the world. Following that, in the autumn of 1997, Sellam Ismail held the first gathering for computer collectors, the Vintage Computer Festival 1.0. That was followed this year with VCF 2.0, and next year the VCF 3.0 will again be held in the fall - October 2nd & 3rd at the Santa Clara Convention Center in Santa Clara, California.

This year saw a significant increase in the public buying and selling of old computers and computer paraphernalia on an on-line auction web site called eBay (www.ebay.com). During the summer, the first ever book about collecting computers was published and a number of articles were printed about the hobby in magazines and newspapers.

Today, there are over 100 collections detailed on personal web sites and about 1,000 collectors worldwide, actively collecting and thoroughly enjoying playing with (er, I mean using), talking about, acquiring, cleaning, and just looking at old computers.

What Is A Collector?

There is an important distinction to be made between computer enthusiasts and computer collectors. We all probably know at least one person who somehow came to own an interesting piece of computing history. This doesn't automatically qualify that person as a collector, but as an enthusiast. It is like you or I came across an authentic, handwritten letter from someone who has made a significant contribution to humanity. Even if we do not have another thing connected with that person, nor had we known much about that person before this discovery, we would probably still keep the letter. We might even mount it and show it proudly to everyone who enters our home. We would own something that everyone can appreciate as special. Collectors, on the other hand, deliberately seek to build a collection (note: size is irrelevant) and seek to enjoy their collection. For instance, the man in Toronto, Ontario who has the almost pool-tablesized control panel from an IBM 360/75 (1968) hanging on a wall in his rec room is an enthusiast. My ten tons of hardware, software, supplies, documentation, control panels, etc. qualify me as a collector.

Terminology

Collecting computers isn't a venerable hobby, yet. Books, coins, stamps, music boxes, etc. have been collected for hundreds of years. This means we can learn a thing or two that will help us enjoy our hobby. Some-

thing every collector should learn is the lingo of collecting. Here are a few important terms.

Antique - The generally accepted definition is something over 100 years old. According to this definition, there are no antique computers. This point can be argued though, if you claim the rate of change computers experience to be substantially higher than changes in humans, computers can be judged to age like dogs do. It is much easier to accept the general definition and stop using the term until sometime around 2040, when the Colossus, ENIAC, Zuse III, and others, will celebrate 100-year anniversaries.

Artifact - A human made object. In a historical context, it usually refers to items in a museum collection.

Classic - Something that was the first of its kind or set a standard by which all other similar things are measured against.

Collectible - Something originally made to be used, not collected, but that eventually stopped being used and was collected.

Ephemera - Something that is useful for a very short time. In collecting circles, ephemera commonly means paper.

Memorabilia - Things worthy of remembrance.

Memento - Anything that reminds you of the past.

Paraphernalia - Apparatus, fur

nishings and ornaments that are somehow associated with each other. The word reminds me of the mainframe days when the word peripheral was popular. It was used to describe all the equipment surrounding the CPU. Tape drives, printers, card readers, etc. were called peripherals.

Premium - A bonus offered as an inducement to purchase, or a reward given for a particular action.

Provenance - A record of ownership and origin. As our hobby matures, this will become very, very important.

Relic - Something considered the last of its kind. It's what's left after other things like it have been lost, or through decay, are no longer functional or restorable.

Vintage - Something that was well known in the past.

Plus, we must agree to use terms that are old, but serve the purpose well. I am referring to the terms mainframe, minicomputer and microcomputer.

Mainframes - Not only are mainframes big, but you must understand that at one point in time, the only type of computer was the mainframe. Mainframes are either old or if they are from 1965 to the present, are physically very large. There are certain architectural qualities that can also be used to distinguish mainframes from high-end minicomputers, but that discussion isn't relevant here. What also makes the distinction difficult to discern

is that mainframe families came in a variety of models and sizes.

Minicomputers - Often are single user, but it is the physical size that separates these machines from others.

Microcomputers - Yes, size here is very important - all microcomputers are small. This should make the categorization easy to discern, but an even easier method is determining if the computer runs on a single microprocessor (an Intel Pentium for instance). If it does, it is a microcomputer and within this category are desktops, workstations, laptops, etc.

Sources

There is still time to find that special something you want in your collection. Years ago, I predicted that the remaining source of big, old computers would be garages, rec rooms and corporate catacombs. I was right. Eventually, enthusiasts must part with their mementos. This explains why still wonderful and interesting things are being found in garages and rec rooms.

My own example of this centers around a unique minicomputer that was shipped to me from a garage on Long Island. Recently, a man called and told me he was moving and needed to dispose of the Data General and Keronix minicomputers he had in his garage. The name Keronix was music to my ears and I'll gladly tell you why, because collectors love to tell (and re-tell) their acquisition stories.

The first successful mini-

computer manufacturer was the Digital Equipment Corporation (DEC) of Massachusetts. From DEC, a competitor was born in the form of Data General (DG). A small company called Keronix built peripherals (memory, disk drives, etc.) for DG computers and eventually decided to build a clone of DG's famous Nova line. That didn't sit well with certain employees of DG, so they burnt the Keronix plant to the ground. Interesting story eh? Still, through all of this, Keronix did build and market the DG clone. one of which ended up in my "warehouse" via Long Island.

Another plentiful source is what I call corporate catacombs. You are likely to find forgotten treasures in storage rooms and in the far corners of warehouses. Over the years, companies (and government organizations) acquired computers by either renting them, leasing them, or buying them. The ones that were purchased were often difficult to let go. They cost too much to simply send to the dump, so they would be moved to an out of the way place until more economical disposal arrangements could be made. Out of sight, they usually ended up abandoned and sitting for years waiting for someone like you to rescue and care for them.

Something a good computer collector should never do is pass by a Goodwill type store. The most remarkable items are donated to these relief organizations. Not just computers, but books, software, hard-to-find cables, and supplies (ribbons, diskettes, etc.). Buying from these organizations demonstrates

the win-win economic model.

History of Computing

The Keronix story highlights a real concern. More than being a concern about the hobby of collecting computers, it is about the way information on the web is interpreted. Beware of legends and hearsay posing as history. People contribute their recollections of a company, product, technology, etc. and then once published, these memoirs become history to those who read them. Due to the nature of electronic public networks, this information is distributed to many others and if it is misinformation, too bad, the damage is done.

If you intend to write about your collection, you must still do your research. When reading postings to newsgroups and lists, or someone's web site, you must do so with a very critical eye. Don't pollute the infosphere, contribute information in a responsible manner.

Collecting Options

Microcomputers are fun. Microcomputers are quiet. Microcomputers are easy to carry, but don't shy away from collecting (and therefore preserving) minicomputers, and yes, dare I say, mainframes. Nothing worthwhile is easy to obtain, so just think of all the fun you'll have sourcing, moving, and finally playing with your fridge or roomsized, big, old computer.

Perhaps you've started with microcomputers deliberately, just to get your feet wet. Then again, perhaps you've convinced yourself that anything bigger than a 286 is out of your range; someday, that big computer bug just might bite you. When and if it does, don't panic, the antidote isn't buying two Altairs and calling your doctor in the morning. Examine your present circumstances and who knows, that classic mainframe just might fit into your life and your garage. But, enough of that. Enough of focusing exclusively on hardware and software. The computer industry has always been big, flamboyant, and diverse, giving collectors many choices. Don't feel obligated to collect actual computers. You can collect books, documentation, magazines, stocks from defunct companies, clothing, mugs, pens, mouse pads, and the list goes on and on. The trick about collecting is to know when to say no. You can't collect everything. You should first decide what your focus will be. It might be one of every computer you have ever worked on. It might be every computer that was based on the Motorola 6800 and 68000 microprocessors. This method gives your collection a theme - something you can use to gauge your effort and increase your enjoyment.

Next, admit that you must concentrate on the theme. If you collect UNIVAC mainframes, don't worry if you can't buy a mint condition plastic "Think Again" sign for \$50. If you collect Sun workstations, don't worry if you can't buy an original family tree poster for \$75. Focus, focus, focus and have fun, fun, fun.

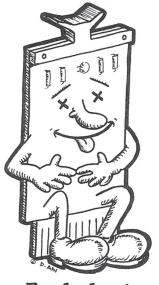
Forecast

There is definitely a future for the hobby of collecting computers. It includes fun, fulfillment, organization, profit, and more fun. Perhaps you don't like what you're hearing. Those words, organization and profit, might upset you, but you must face the inevitable. The world of collecting computers is changing, but hey, change is what computers are all about. If you can't see how such a relatively new, informal, loosely-knit community, as we currently see ourselves, can ever turn into the fine tuned machine that stamp and car collecting has become, then we should examine the past and see what we can learn from it.

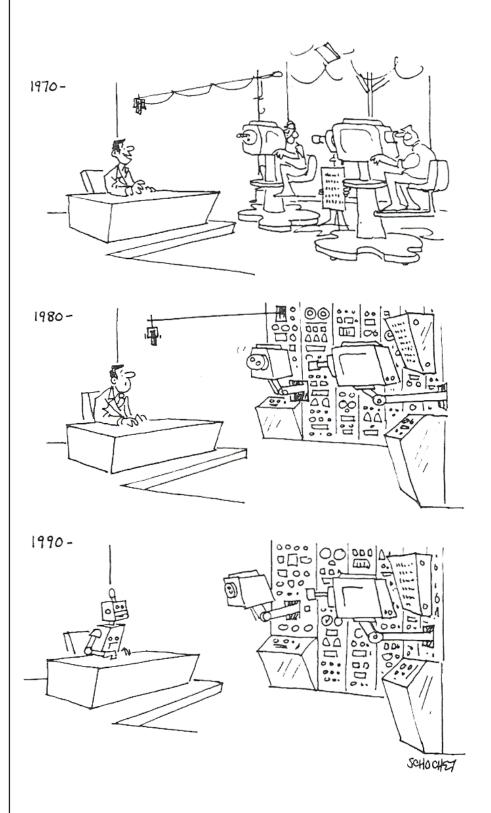
Let's take an older, similar technology that is collected and compare it to computers. We'll see what is different and what is similar about the technologies and see how, if at all, the technology affected collectors. The examination might tell us what we should expect to see in our hobby. The car is the standard we'll use in this comparison. Hopefully this exercise will convince you that what has happened to the hobby of collecting cars can happen to computers.

	Car	Computer
Popularity of the technology:	High	High
Relative age of the technology:	Young	Young
Relative size of the technology:	Big	Big
Technology lifespan:	Brief	Brief
Technology rate of change:	High	High
Level of expertise to maintain:	High	High

As you can see, computers and cars have much in common. For instance, both are such new technologies that most people consider them too recent to collect. Both are big and typically not easily moved and stored. Both experience frequent upgrades which potentially increase their collectibility, but on the other hand, their disposal can be easily justified. Both are popular, utilitarian technologies. Both are also complex and require a level of expertise to maintain. The similarities inherent in the technologies will be reflected in how their respective collecting hobbies evolve. If you know how active and successful collecting cars has become, then it follows that our hobby will grow, mature, become less esoteric and more mainstream. It will become attractive to a generation with little or no prior contact with the computers and computer collectibles they collect. It might become an industry in itself.



Freaked-out Freddy Flip Chip



The Alto Computer The Mother of Invention?

By UNKNOWN*

he Alto Computer can be considered the source of many of today's GUI concepts and systems. But the Alto was designed as a research tool, and as such had many "faces" depending upon what a researcher needed. The Alto had many different environments, some of which were very antiquated. Only the Smalltalk development environment sported a fully integrated GUI. The normal Alto operating system (called the Alto OS) was command line

oriented. From this command line you could run programs like WYSIWYG (What-You-See-Is-What-You-Get) word processors or bitmap drawing programs.

Design

The Alto was designed in two months (from 11/72–12/72) and

two wirewrapped prototypes were created in four months (from 1/73-4/73). Three people worked on the design and implementation of those units.

Implementation

The Alto was produced from 1973 to 1979. There were two models (the Alto I and II) developed with the model II superceding I. RAM size started at 64K words (an Alto word was 16 bits thereby making the 64K model really contain

128K bytes). RAM size for the later Altos were 256K words (512K bytes). The Alto's digital hardware used MSI (medium scale integration) chips and was rather large compared to todays micros. The processor was custom-built by Xerox and occupied five boards with around 70 chips each (this makes the CPU have around 350 chips!) RAM consisted of around 312 chips. The I/O Controllers resided on three boards with 60 chips each (180 chips total). The Alto

mouse had three buttons (mainly for use by the Smalltalk development environment).

Software

Word processing was a major Alto activity and Xerox produced two word processing programs, Bravo (later improved and called BravoX) and

Gypsy. Bravo was the first WYSIWYG program, but was difficult to use due to it being modal. Gypsy was less modal and therefore easier to use, but was not as powerful as Bravo. Each programming language for the Alto also sported its own simple word processor for source code files. Alto also included a collection of three drawing programs, Markup (bitmap editor like the Apple Macintosh's MacPaint), Draw (splines like the Macintosh's MacDraw), and SIL (technical drafting using only horizontal

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with II



and vertical lines with characters and special symbols).

Programming Languages

BCPL (predecessor to C), Mesa (Pascal-like but with module handling), Smalltalk (fully integrated, the highlight of the Alto GUI), LISP (boring to me), and Cedar (very sophisticated, integrated).

The Daughter? Apple Lisa

Origins

Apple began work on a computer called Lisa (named after Steve Jobs' illegitimate daughter) in mid-1978. This system was text-based, had a green monitor and dark case, and was to be powered by a custom CPU built by Apple (this was a fast bit-slice CPU that executed Pascal P-Code). In October 1979, Apple dumped the bit-slice CPU for

the Motorola 68000 since it was cheaper. At the end of 1979, several Apple people visited Xerox PARC, saw the Alto and Smalltalk's GUI, and changed the Lisa to be a GUI machine from then on. As such, the Lisa did not begin life as a GUI system, but rather as a staid text system whose only merit was that it was to be a fast 16-bit system. You could say the Lisa went through three iterations, with the third

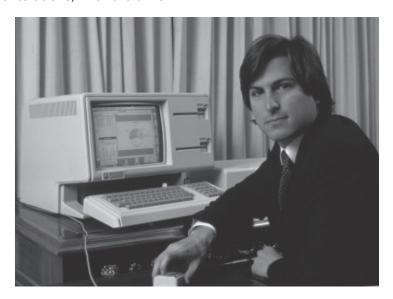
being the GUI system which Apple sold commercially. Note that Apple implemented Smalltalk-80 on the Lisa around 1980–81 as a R&D environment.

Hardware

The Lisa pixels were rectangular, since this pixel shape produced more readable characters. The Lisa's 68000 CPU ran at 5MHz (compared to the Macintosh's 8MHz), but the Lisa wa somewhat faster than the Macintosh, since the Lisa used DMA and supported distributed internal processing via several microprocessors (the keyboard contained a COPS chip, the Twiggy 5.25 860K disk drives contained a 6502 chip).

Operating system

One can in no way say that the Lisa operating system was not quite as refined as the Macintosh operating system (as *Historically Brewed* once said). The Lisa's low-level OS was very advanced and supported processes, non-



premptive multitasking, and demand-page based virtual memory (a scheme Apple may adopt for Mac OS 9 in the future). The high-level OS (called the Desktop Manager or the Lisa Finder for Mac people) supported inter-application events (Apple now calls these AppleEvents), a document-centered interface via stationary pads (the Mac is application-centered), and nonphysical (logical) document names (i.e. a document name could be up to 63 characters long for the userthough the Lisa File System supported physical names with up to

31 characters). Documents could

also have the same name in the

Boot ROM

same folder.

The 16K ROM contained code that tested the system at startup and booted the operating system. Nothing else was in the ROM (e.g. user interface code). This scheme was adopted for the Lisa (versus the Macintosh scheme of having a lot of code in the ROM) to make the Lisa more versatile from an OS perspective. For example, the ROM first loaded the OS Loader, then the OS Loader loaded the Lisa low-level OS (or MacWorks if you had the MacWorks disk), then this OS loaded the default high-level OS Shell (e.g. the Lisa Office System or the Lisa Workshop or UNIX), then the Shell (which was called the "Desktop Manager" by users) loaded the various Lisa tools (a.k.a. applications).

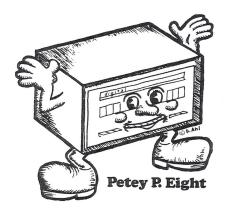
The Lisa's user interface was based on a set of code modules

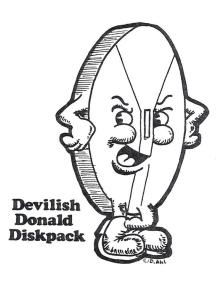
collectively called the Lisa Desktop Libraries. This library resided in two files on the Lisa hard disk and not in the Lisa boot ROM. This implemented such familiar features as windows, mouse handling, and graphics drawing. This library code was around 500K in size and was mainly written in Pascal. Apple later took parts of this library and recoded them in 68000 assembly language for the Macintosh 64K Toolbox.

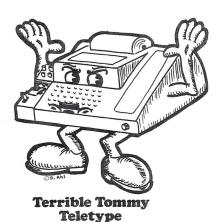
One area of *HB*'s GUI article which I found remiss was the lack of names associated with the development of today's GUI. It seems that many UI designers migrate from one company to another improving their UI strengths at each successive company. Xerox obtained several UI designers from other companies to found Xerox PARC.



Apple hired several Xerox people for the Lisa development (e.g. Larry Tesler - GUI, Tom Malloy - Bravo / LisaWrite). Microsoft hired Charles Simonyi, who directed on the Alto software development and who reimplemented Bravo on the IBM PC. He called it MicroSoft Word.







The First Bug

What was it?

By UNKNOWN*

hat was the first bug? That is, when did people start referring to the glitches that computers make as "bugs?" In my own case, it happened about two lines into my first computer program, back in 1972. For my initial plunge into computing, I had decided upon:

10 PRINT "HI, I'M THE COMPUTER. WHAT'S YOUR NAME?"
20 INPUT A\$
30 PRINT "PLEASED TO MEET YOU ",A\$

Not exactly a world-changing, productivity-boosting, paradigm-shaking bit of code, but hey - you have to start somewhere. I punched RUN into the school teletype and prepared to key in my name. However, the computer on the other end of the acoustic coupler (a Hewlett-Packard HP-2000C time-sharing beast) only allowed a single letter for my name. After I typed the "L" it spit out:

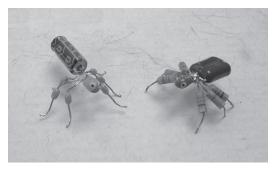
PLEASED TO MEET YOU L

I then understood, almost intuitively, that I had a "bug" in my program. Which led me to change line 20 to read:

20 INPUT A\$;B\$;C\$;D\$;E\$

This worked great, if you had a fiveletter name. The next day, I discovered that in HP-2000 BASIC, strings had to be DIMensioned before they could hold more than a single character. Armed with that knowledge my programs started getting longer. Though I didn't realize it at the time, I was following in a grand tradition. After the first program, comes the first bug.

The FIRST bug then, probably occurred on the first computer program, run on the first computer! Curiously, I've never heard of any stories of bugs in the ENIAC. And since Charles Babbage's 19th century Analytical Engine was never built, we'll never know if Ada Lovelace's software would have run. But, the earliest bug we do have documented is truly a great one.



A Harvard professor named Mark Aiken was among those men 50+ years ago who had a vision of machines that could compute. He persuaded Harvard University that they should create such a machine, and he talked IBM into building it - the IBM Automatic Sequence Controlled Calculator (ASCC), or the Harvard Mark I. An inspiring-looking machine, the Mark I stretched 55 feet down one wall with gleaming art-modern chrome and glass accents.

The guts were not as sophisticated as the packaging though. Fearing that elec

The FIRST bug then, probably occurred on the first computer program run on the first computer. Curiously, I've never seen an stories on bugs in the ENIAC.

tronics (remember, this was the tube era) were unreliable, IBM built the calculating machine from thousands of electromechanical relays! Unlike tubes, relays didn't burn out. They did have some drawbacks however. Relays aren't fast. IBM's press materials proudly pointed out that the Mark I could add numbers up to 23 digits long at the rate of three additions / second. It could also multiply two numbers in 6 seconds and divide in 12 seconds. These speed records didn't last long.

Relays also made noise - a lot of noise. The Mark I made a sound described, rather charmingly, as resembling hundreds of knitting needles, as it ran calculations fed to it from giant paper tapes. Relays also ran into other problems, and here's where our first bug occurs. The giant machine would

occasionally seize up with errors. Sometimes a relay wouldn't make contact. This glitch was intermittent and hard to track down, until one day the technicians working behind the machine found the culprit - a computer bug. A real bug - a real dead one. A moth had fluttered into the machine and gotten crushed under the contacts of a relay!

The exact details of the story vary, but the outcome does not. The moth was removed, and

placed under transparent tape on a page of the Mark I's operating logbook with the notation, "First actual case of bug being found." The logbook exists today in the archives of the U.S. Navy. You can look it up.

It's tempting to claim this as both the first computer bug, and as the origin of the word "bug" in the sense of glitches and problems. Certainly most people wouldn't argue this, but it isn't so - the word "bug" predates the computer.

Here's a mystery for you: I have before me a reference to "bugs" - instantly comprehensible in context - from way back in 1878. The speaker apologized to the press for delays in getting his newest technology out to the public, claiming he still needed several months or perhaps a year

1000 and started Source Tape (Sine check)

1500 Started Cosine Tape (Sine check)

1500 And Started Cosine Tape (Sine check)

The First actual case of bug being found.

1700 And John.

The First Bug

"to get the bugs out." He went on to write, "It has been just so in all of my inventions. The first step is an intuition, and comes with a burst, then difficulties arise - this thing gives out and [it is] then that 'Bugs' - as such little faults and difficulties are called - show themselves and months of intense watching, study and labor are requisite before commercial success or failure is certainly reached."

The speaker - sounding remarkably like a 19th-century Bill Gates - was Thomas Edison. The high technology he was wrestling with was the electric light bulb (and thank goodness he didn't call his product "Light '78!").

Which came first, the bug or the computer? Surprisingly, the bug. It's at least as old as Edison. How much older? Good question. One can almost imagine Johannes Gutenburg, struggling with version 1.0 of his print-

> ing press, trying to work the bugs out so he could bring printing to the masses.

> Pleased to meet you Johannes. We have something in common.

Editor's note: During layout and editing of this article, I discovered that this moth was actually found in the relays of the Mark II in 1947. It is often erroneously attribut-

ed to Grace Hopper as well, who wrote about it, but did not find it.

COMPUTIN' IN THE OL' DAYS



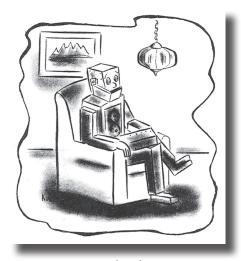
"...We'd like to put two bucks on 'Happy Daddy' running in the seventh today..."



"A box of CMOS please. He gets terrible migraines when he has to do intricate figuring."



"Looks like it might be a nice day tomorrow!"



"I compute therefore I am."

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Byte Nostalgia A Look Back at the Magazine

By Bill Mitchell

happen to have *Byte* issue #1 from September of 1975 in front of me, and thought I'd take a quick nostalgic run through it. It's 96 pages long, and 50,000 issues were pressed.

Wayne Green and Carl Helmers each have a scene-setting article. Wayne described how Byte started, and Carl

tried to define what "homebrew computing" was and how Byte would fit into it.

Hal Chamberlin's article, "Which Microprocessor for You?" begins, "At this time there are three microprocessor chips or chip sets readily available to the hobbyist: the 8008, the 8080, and the IMP-16." It seems to me that the 6800 should have been in that list as well.

James Hogenson reviewed the RGS-008A Microcomputer Kit, an 8008 based machine with 1K of RAM. The Front Panel provided rocker switches for loading bytes into RAM, and the program was started by setting a Restart instruction into the Front Panel DATA switches and pressing an "INT" switch. The kit price was \$325, a cassette tape adapter kit was \$100, and \$43.75 for a TTL parallel interface (the only peripheral interfaces available). Those

are 1975 dollars folks. The article concludes, "... The 008a is one of the most economical systems on the market, ..."

Carl Mikkelsen's article on Recycling used ICs described how to remove ICs from surplus boards using a propane torch and vise grips for reuse as project components.

the small systems journal Which Microprocessor for you? Cassette Interface - Your key to inexpensive bulk memory Assembling Your Assembler Can YOU use these SURPLUS KEYBOARDS? (You bet you can!) COMPUTERSthe World's Greatest Toy!

No electronics hobbyist magazine of the period would have been complete without an article by Don Lancaster. Don's article is titled "Serial Interface." It describes synchronous and asynchronous serial data, presents circuitry for serial interfaces and describes and presents circuitry for 20ma, 60ma, RS-232, RS-422, and GPIB inter-

faces. It also describes and presents circuitry for a 300 baud cassette interface, discusses radio data links and presents circuitry for a RTTY receiver. Lastly, presenting and describing circuitry for a Bell 103 300 baud modem interface, and discussing DTMF signaling. At 16 pages, it's a typical Don Lancaster piece which leaves you with eyes glazed over, planning soldering iron time and thinking about parts sourcing.

There's a Clubs section which introduces several microcomputer clubs around

BYTE magazine was a microcomputer magazine, influential in the late 1970s and throughout the 1980s because of its wide-ranging editorial coverage. It was not dedicated to a specific platform, but to developments in the entire field. the county. I was going to Chicago Area Computer Hobbyist Exchange (CACHE) meetings around this time, but we didn't get into this section. Oh well (moment of silence here in memory of Ward Christiansen).

Chris Ryland has a short article on "How to Write for *Byte*," and seeking authors (most of the articles in the initial issue are by members of the *Byte* editorial staff).

Dan Fylstra has a nine page article titled "Write

your own Assembler." Carl Helmers has a hardware oriented article titled "Deciphering Mystery Keyboards," an article on Charles Conway's Game of LIFE (he credits Conway, and points readers to Martin Gardner's column in *Scientific American* (now sadly defunct), and a book review of the best book ever written on the craft of programming -- *Elements of Programming Style* by Kernighan and Plauger.

There's even a Letters to the Editor section -- pretty neat for the initial issue of a new magazine.

Full Basement

An interview with & by Brian Mahoney, computer collector

hat's all that stuff in your basement?
By that I guessed my visitor meant the stacks of computers, disks, magazines and cords in two of my basement rooms. You see, besides poverty, the only thing that I am on the cutting edge of is computer collecting. "Its my hobby," I explained. "Wanna play 'Hunt the Wumpus'?" I asked.

Where did you get all this?

For the last couple of years, I have scrounged garage sales, flea markets, want ads and thrift stores for anything and everything to do with old, antique computers. Antique is a relative term here. For me, it means something that is totally useless in terms of practical computing, but something that at one time was very serviceable and, frequently, very expensive. My particular interest is home computing. Someday I would love to open a home computing museum where visitors could actually play a game of "Hunt the Wumpus" or Zaxxon or Missile Command. For the time being however, you will have to visit my basement.

What types of computers do you have?

Everything from Commodore Vic-20's, C64's and C128's, to a Hyperion portable, a couple of Franklin Aces and this thing called a Decider. The Decider is an Apple II clone but this is far nicer in appearance than the run of the mill Apple. It has a wooden case and a painted metal cover, but only a black and white video output. That's OK as, I don't have the special RGB interface anyway. Besides these computers, I

have many others in what used to be a guest bedroom, Apples, Tandys and so on. Oh yeah, there's another stack in the washroom cupboard, a few more IBM clones set up on the family room corner table . . . uh, and some monochrome monitors and XT shells on a shelf between the rafters.

Is that it?

Not really. To support all of this hardware, I also have a large collection of books, manuals and schematics. The books are from the days when you couldn't go down to the software store to pick up the latest computer game. You had to sit and write your own or laboriously copy out someone else's program. There are also piles of magazines from the early eighties, listing almost all of the equipment I own at its original price. I should say that the magazines also give you some kind of idea of the growing interest in home computing, the excitement and the early versions of some of the stuff we have today. Of course, the mags have programs in them, too.

Anything else?

Well, there's the software. Boxes and boxes of 5 1/4 inch diskettes, game cartridges, cassette tapes with programs on them, and a few low density diskettes. While this material is mostly Apple based, a good deal of it is Commodore based, lots of Vic 20 and 64 items and some for the 128 and something called Windows Version 1.

So that's it right?

Not exactly. There's also a large pile of game consoles and modules, mostly ColecoVision, Nintendo and Atari. These are from garage sales mostly. I've got this neat steering wheel module with a gas pedal attachment. Wanna play "The Dukes of Hazzard"?

Are they considered computers?

Well, you could ask yourself the same thing about the computers we are using now. In twenty years we might be saying, "Hell, those weren't computers. These are real computers." At the time, these video game modules were revolutionary. They were interactive before anyone knew what interactive meant. And they are still alot of fun. The games were generally non-violent and loads of fun. I have one titled Impossible Mission which plays on the Commodore 64, complete with great sound and wild visuals. It is difficult to play and has many levels and, this is the best part, when the guy misses his footing and falls into the pit there's this incredible scream. Its the same scream they use now in Duke Nukem 3D. Duke Nukem has many bits of trivia in it referring to retro-computing and the scream is a reference all the way back to the Commodore 64.

What's the point really? Isn't this just someone else's junk?

Maybe, but have you priced an old Victrola lately? A brightly painted metal lunch box? A 1957 Chevy Belair? I myself had a Robin Hood metal lunch box and Thermos about 35 years ago. Conservatively, it would be worth sixty-five bucks now. Who knows what the Decider will be worth in another twenty years? Or the Franklin Aces? Someone on the Web thinks

the Franklins might be worth a hundred bucks now. That's ninety more than I paid, one eighty for the pair. The trick is to find the right buyer, so you want to keep all of this and sell it later. Not really though, If I have several of the same model I might consider it, but the point, and, you'll have to sit down for this one . . . the point is that this stuff is all going into landfills and if someone doesn't grab a bit of it here and there, there won't be anything to show my kids or your kids! Automobiles progressed from horseless carriages to Saturns over many decades. Computers, home computers that is, haven't even been around for twenty years, yet look how far we've come. The average home computer now has the speed and capacity of the supercomputers from less than twenty years ago.

Have you been computing for a long time?

Just the opposite. I have only been in this or any form of computing for a few years. You see, the first computer I bought, the Commodore 128, was at a garage sale. The main reason for picking it up was that it had a color monitor. I knew I could use that monitor for showing videos to the kids by hooking it up to a VCR. The computer interest came later when I decided to put it all together for word processing. Then I discovered the games. The rest, as they say, is history.

Where does it go from here?

Well, hopefully more people will get on the bandwagon. The beauty of collecting is that the items that are collected become treasures, and treasures are kept for a very long time. The end result is that these relics, these pieces of metal and plastic will now be around for quite some time. There are some concerns about EPROMS gradually deteriorating and other memory problems, but I figure sooner or later there will be a solution for that.

Kind of like watching paint dry?

Some people have that point of view, but the beauty of collecting is that there is always something for everyone. In the world of computer collecting, you would be surprised at the diverse items that people find attractive. One fellow has a group of office computers in his apartment. Another has large business units in a warehouse. Still others collect software, magazines, advertising and all the various and sundry bits that go with computers. Anyone can get started, probably with what they have. If you have an old unit in your home now, try to locate user groups who specialize in that particular model. Atari and Commodore user groups are worldwide. Even the Internet, actually the Web, is full of retro computing sites, some having emulation programs to make the latest computers run like the relics that I have in the basement.

You're kidding, right?

Not at all. I have a program right now on my IBM that will allow me to run Apple II programs. The starting screen is exactly like the various Apple II's I have downstairs. But I would rather boot up one of mine and wait for the disk drive to grind its way along. That gives me more of a sense of true history.

Well, I guess I'm somewhat educated now. Let me try that Whump the Humpus thing! It's Hunt the Wumpus. It'll only take me a minute. I think I saw it in one of these boxes.

The world's densest computer chip is now the heart of the world's most affordable 32-bit computer.



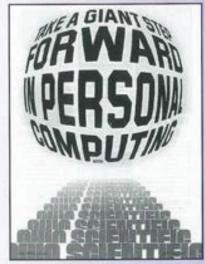




A HOME COMPUTER

as seen by George Beker





THE Historical Computer Society's

HCS Store

On-Line Auction

Classifieds

Stories

we're connected . . .

on the internet visit . . .

The Virtual Computer Museum



