December

Dickens and Babbage

Dec. 1855

Charles Dickens attended Charles Babbage's [Dec 26] Saturday famous soirees at least once [March 00], where he may have seen a demonstration of the first Difference Engine [June 14] and listened to chitchat about the Analytical Engine [Dec 23].

Dickens probably based the character of the struggling inventor Daniel Doyce in "Little Dorrit" partly on Babbage and on his engineer, Joseph Clement. The book's fictional Circumlocution Office satirizes the British Treasury and its dealings with Babbage over funding for his engines. Doyce is described like so:

"He was not much to look at, either in point of size or in point of dress; being merely a short, square, practical looking man, whose hair had turned grey, and in whose face and forehead there were deep lines of cogitation, which looked as though they were carved in hard wood."

The novel first appeared in serial form, in 19 monthly instalments published between Dec. 1855 and June 1857.

The PSRC

Dec. 1944

The IBM Pluggable Sequence Relay Calculator (PSRC) was a special purpose punched card machine for determining artillery firing trajectories for the Army. It's sometimes called the missing link between punched card equipment and the stored-program computer.

Its specification was due to Wallace Eckert [June 19] but the machine was designed and built by an IBM team led by Clair D. Lake and Benjamin M. Durfee, who had previously worked on the Harvard Mark 1 [Aug 7] with Don Piatt. Durfee and Piatt would later be assigned to the SSEC [Jan 27].

One of the Aberdeen PSRCs. Photo by Eric Hankam. (c) IBM Archive.

The first two PSRCs were delivered to the Ballistics Research Lab (BRL) at the Aberdeen Proving Ground in Dec. 1944, where they were known as the Aberdeen Relay Calculators.

The Aberdeens were America's fastest digital calculators at the time, capable of 24,000 six-digit multiplications per hour, twenty times faster than the Mark I. They were still being used in 1952, by which time the BRL also had the ENIAC [Feb 15], the EDVAC [April 12] and ORDVAC.

The IBM 604, an electronic (vacuum-tube) version of the PSRC was released in [June 00] 1948. The 604 was the main computing element in IBM's Card-Programmed electronic Calculator (CPC), which sold very well until moderately priced, stored-program computers became available in the mid-1950's.

Jeffrey Armstrong

(aka Saint $ilicon)

Born: Dec. 1947;

Detroit, Michigan

In 1987, Armstrong published "The Binary Bible of Saint $ilicon", an omnibus of prayers, nursery rhymes, and commandments, such as "Thou shalt not covet thy Neighbor's System," which he claimed to have "translated from the Old Geek." He also revealed that the Mexican version of MS-DOS is "DOS Equis" and the Swedish is "Häagen-DOS."

At the height of his renown, Armstrong donned vestments, glued a microchip to his forehead (" the third I/O") and presented pun-filled "DOSpels" to thousands at COMDEX [Dec 3].

A typical sermon began:

"Dearly C-loved, we are assembled here together because PCing is believing. We're here to console you; ASCII and ye shall receive. We say there is a life worth debugging. Data, data, everywhere, but not a thought to think, that's the problem…. Friends, perhaps you know someone out there with a terminal illness…"

Armstrong also founded the world's first tech religion, The Church of Heuristic Information Processing (C.H.I.P), and became its sole prophet and apostle [April 4]. Then he gave it all up: "I lost interest and everyone was self-interested."

Armstrong is now a spiritual teacher and astrologer living in Vancouver, where he founded the Vedic Academy of Sciences and Arts, and is the author of numerous books including: "Spiritual Teachings of the Avatar, Ancient Wisdom for a New World."

FORTRAN Begins

Dec. 1953

John Backus [Dec 3] submitted a proposal to IBM to develop a practical alternative to assembly language for programming the IBM 704 [May 7]. FORTRAN ("FORmula TRANslator") would simplify the programming process by allowing the use of algebra-like expressions when writing software.

Backus' boss, Cuthbert Hurd [April 5], gave him the go-ahead, and work began in early 1954.

Backus sought out a development team with "creativity, a lot of smarts and experience. We had a great variety of people: a physicist, a crystallographer, an English major."

For example, Sheldon Best, on loan from MIT, wrote the part of the compiler that decided how to use the 704's index registers efficiently. Roy Nutt, formerly head of the data center at United Aircraft, was responsible for the FORMAT I/O, and Harlan Herrick decided to call the language's unconditional jump a GOTO [May 11].

For relaxation, the team held lunch-time "blind chess" matches and, in the winter, impromptu snowball fights.

The first FORTRAN program was successfully run by Herrick on Sept. 20, 1954. A preliminary report on the language was released on [Nov 10] 1954. The first FORTRAN manual appeared two years later on [Oct 15] 1956, followed by the first compiler in 1957 [Feb 26; April 19].

Computer Art

Dec. 1956

The earliest known computer-generated art work was a glamor girl image, probably copied from the December 1956 pinup drawn by George Petty for that year's *Esquire* calendar.

The image was displayed during the execution of a diagnostics program used when data was transferred between two SAGE [June 26] computers. The rendering was made possible because each console included a 19-inch circular cathode ray tube (CRT) that could draw vector lines. We know all this because budding historian Lawrence Tipton snapped the only known photo of the pinup during his time at Fort Lee in Virginia in early 1959.

SAGE veterans also remember another risqué diagnostics program that debuted around 1960. It featured the outline of a topless hula dancer. Flipping the correct switches on the console would cause the girl's hips to sway, synchronized to music played on the console's buzzer. If the operator pointed the console's light gun (another handy part of SAGE's design) at the dancer's navel and pulled the trigger, her skirt would drop off and the screen go blank. Sadly, there's no pictorial record of that program in action.

CTSS MAIL

Dec. 1964

Tom Van Vleck and Noel Morris implemented the first e-mail program for MIT's Compatible Time-Sharing System (CTSS [May 3]) in the summer of 1965. However, the original idea of having a CTSS MAIL command had been proposed in "Programming Staff Note" (PSN) 39 by Louis Pouzin, Glenda Schroeder, and Pat Crisman in Dec. 1964. The full story was explained in a series of fascinating articles that appeared in *The New York Times* in June 2011, written by the noted filmmaker Errol Morris (and brother of Noel).

In the mid-1960's, Van Vleck wrote another "mail" command, this time for Multics [Nov 30] that he modeled on CTSS MAIL, and Bob Frankston [June 14] (then an undergraduate) contributed a Multics version of text messaging.

To be clear, these tools only allowed users to communicate on a single time-sharing computer. The first program for sending e-mail over the ARPANET [Oct 29] was probably Ray Tomlinson's [April 23] extension to SNDMSG in 1971.

By the 1970's, there were over a thousand CTSS users. Van Vleck was mightily displeased one day in 1971 to discover that a sysadmin had sent a long anti-war message to every user. It began:

> THERE IS NO WAY TO PEACE.
> PEACE IS THE WAY.

Van Vleck pointed out that this was inappropriate and possibly unwelcome, but the individual only replied, "but this is important!" In other words, this may have been the first spam message, although Gary Thuerk is usually granted the award for that innovation [May 3].

Another contender for first email (on a time-sharing machine) are the DIAL, LINK and JOIN commands on the SDC [Oct 00] AN/FSQ-32 (aka Q32) at DARPA. They were developed by Larry Roberts [Dec 21] and Thomas Marill in the early 1960's.

For an alternative view on the origins of EMAIL, see [Aug 30].

PDP-7 (and UNIX)

Dec. 1965

The PDP-7 was DEC's third 18-bit machine, and quite similar to the PDP-4 but less expensive, retailing at a very reasonable $72,000. It was the first machine to use DEC's "flip-chips", 3 by 5 inch boards holding multiple discrete components. Also, the standard core memory capacity was set at 4K words, expandable up to an impressive 64K words (equivalent to 144 KB).

The PDP-7 is probably best remembered as the computer where Ken Thompson [Feb 4] began developing UNIX. He was looking for a machine suitable as a home for his "Space Travel" game, which he had nurtured on Multics [Nov 30] until Bell pulled out of the project in April 1969. He had first tried porting the game over to a GE 635 running GECOS, but the OS processed jobs in batch mode which was poorly suited to playing games. Thompson then found an unused PDP-7, which sported an excellent Graphics II terminal (offering a resolution of 1024 x 1024 pixels). Also, the machine's OS, DECsys, provided an interactive, single user, program development environment for Fortran and assembly language. However, the OS worked best on a PDP-7 with 8K words of memory and two DECtape mass storage drives, while the machine

commandeered by Thompson only had paper tape storage. This meant that porting "Space Travel" required Thompson to build his own floating point math library, assembler, debugger, file system, and various tools for manipulating files. In effect the cut-down PDP-7 forced him to begin coding up UNIX.

Around 120 PDP-7s were sold during their five years of production, and today there's some debate about which one was appropriated by Thompson. Bell Labs had four PDP-7s in the summer of 1969, and based on their hardware specs, researcher Warner Losh thinks that Thompson adopted model number 34.

Losh also believes this machine had a starring role in the 1968 Bell Labs educational short film, "The Incredible Machine", which promoted the lab's work on computer graphics and music. In the video, Max Matthews [Nov 13] is seen listening to his "Daisy Bell" tune [Jan 12], and the graphics work of A. Michael Noll [Aug 29] and Kenneth C. Knowlton [Feb 28] also appear briefly.

Thompson moved "Space Travel" and his proto-UNIX over to a PDP-11 [Jan 5] upon its arrival at Bell Labs in 1970, and UNIX was operational by Feb. 1971. The first edition of UNIX was released on [Nov 3] 1971.

Intel SIM4-01

Dec. 1971

When Intel introduced the 4004 [Nov 15], suitable development aids were also needed. The result was the SIM4-01 printed circuit board, measuring 8.4 by 5.7 inches. It had plugs to hold a 4004, four RAM chips (to store a total of 320 4-bit words), and four EPROMs (for 1,024 8-bit words).

Although only intended as a development and marketing aid, the SIM4-01 could be considered a general purpose 4-bit computer, and therefore the first microprocessor-based computer ever.

For a while (Oct-Nov 1971), the SIM-4 was known as the Intel 4004 micro-Computer, but the name was changed so that Intel could argue that it wasn't selling "computers", only "simulators".

Several commercial products used the SIM4-01 board (and its -02 and -03 revisions) as a processor module, and SIM4 sales approached the $1 million-a-year range in 1972.

HP 9830A Released

Dec. 1972

The 9800 series marked HP's transition away from programmable calculators (as typified by the HP 9100 [Oct 4]) towards desktop computers.

The 9830 had a full alphanumeric keyboard a 32-character red LED display, a cassette tape drive, and ran BASIC. The machine could be expanded via multiple ROM and peripheral interfaces slots.

A HP 9830A with an optional 9866 thermal printer mounted on top. Photo by Hydrargyrum. CC BY-SA 3.0.

HP marketed the 9830 primarily to scientists and engineers, and often advertised it as a calculator since many companies still had complex procedures for purchasing "computers".

From the late 1970's until early 1980's, there was a distinct group of machines that were desktop computers in all but name: they included the 9830, the Tektronix 4051, the IBM 5100 [Sept 9], and Wang 2200 [May 00]. They disappeared with the arrival of 'true' PCs such as the Apple II [June 5] and IBM PC [Aug 12].

IBM 6640

Dec. 1976

The growth of ink-jet printing arguably dates from today's introduction of the 6640 printer, the first able to operate unattended – it could feed itself with paper and change typefaces automatically under program control. However, print quality was only acceptable at 240×240 dpi, often made worse by ink splatter, and it cost over $20,000. Usually, the HP Thinkjet is considered the breakthough inkjet device [Feb 1].

The 6640 was originally called the 46/40 but was renamed to better fit into IBM's Office System/6 word processing range.

Electric Pencil

Dec. 1976

Michael Shrayer released Electric Pencil, the first word processor for a microcomputer. It implemented features such as word wrap, line and paragraph indentation, centering, underlining, and boldface.

Electric Pencil worked on systems using the Intel 8080 [April 18] or Zilog Z80 [March 9], and only required 8K bytes of memory. It grew out of an editor Shrayer had written for correcting his assembler code on the MITS Altair [Dec 19], called the Extended Software Package 1 (ESP-1).

Shrayer has cryptically explained that the "Electric Pencil" name was a joint effort: "My wife came up with one of the words and I came up with the other."

By July 1978, twelve versions were available to accommodate different configurations of monitors, printers, cassette recorders, and disk drives. Shrayer eventually grew bored with all the programming, and sold the rights. Also, powerful alternatives, such as WordStar [Sept 00], started appearing at around this time.

Shrayer had previously been a member of the executive staff of the TV programme, "Candid Camera".

PARC Demo for Apple

Dec. ?? and ??+2, 1979

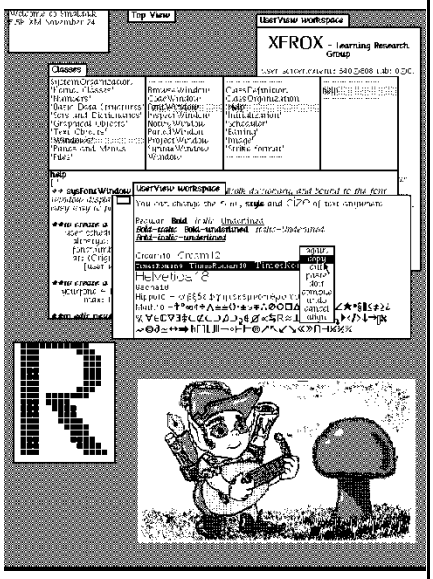
Prev: [Nov 00] Next: [Jan 19]

Steve Jobs [Feb 24] and his Lisa team [Jan 19] visited Xerox PARC [July 1] twice in December. PARC's director, John Seely Brown had invited Jobs to view their technology in exchange for the option to buy pre-IPO Apple stock [Dec 12]. The principal PARC engineers involved were Adele Goldberg [July 7], Larry Tesler [April 24], Dan Ingalls [Oct 12], and Diana Merry.

At the first demo, Jobs' team saw the Alto [March 1] (or probably the more powerful Dorado [May 6]), Bravo [Oct 00], and several graphical applications coded in Smalltalk. None of this should have been that surprising since the Alto and Smalltalk had been around for several years by this point. These tools were not top-secret: Alan Kay [May 7] had written several articles about them (e.g. in the Sept. 1977 issue of *Scientific American*), and Goldberg had published a piece in *IEEE Computer* in March 1977.

Two days later (although a few authors believe the interval was nearer a month), Jobs and his team returned. This time Bill Souders, the head of Xerox's business planning group, ordered a demo of more secret stuff.

Tesler later recalled that Bill Atkinson [April 27] stood so close to him during his demo that Tesler could feel Atkinson's breath on the back of his neck. "He was asking extremely intelligent questions that he couldn't have thought of just by watching the screen," Tesler recalled.



The Smalltalk-76 GUI. Photo by SUMIM.ST. CC BY-SA 4.0.

Certainly, the appearance and functionality of Smalltalk's interface affected the Lisa and Macintosh [Jan 24]. Lisa's original GUI was far more static than the Alto's. It lacked Smalltalk's dynamic overlapping windows, and only displayed one active application at a time, which took up the whole screen. Nor did the Lisa originally place much reliance on the mouse.

Later Jobs admitted to loving the GUI so much that he'd missed the importance of networking and object-oriented programming which Smalltalk also highlighted.

Early in 1980, Jobs asked Xerox for a license to use Smalltalk in the Lisa, but Xerox turned him down. Not easily dissuaded, Jobs offered Tesler a job in April, which he accepted. Tesler went on to head the Lisa user interface team and help design the Macintosh, and eventually became Apple's chief scientist.

Ten years later Xerox sued Apple [Dec 14] over its GUI.

Locksmith

Dec. 1980

The first microcomputer bit 'nibbler', Locksmith, was released for the Apple II [June 5]. A nibbler is so named because it copies data from a floppy disk one bit at a time by talking directly to the drive's hardware. This bypasses any copy protection scheme that the owner of the disk's data might be employing. Later Locksmith evolved from purely a bit-copying program into a powerful disk and memory utility.

The first few versions were distributed by Omega Microware, which was co-founded by Dave M. Alpert, who also happened to be the president of the Northern Illinois Apple users Group. He was widely believed to be Locksmith's author, always denied it.

Some other companies involved in the nibbling business included: "Rip 'Em Off Software", "Pirate's Cove", and "Mr. Xerox".

Zork 1 Released

Dec. 1980

"Zork: The Great Underground Empire - Part I", later known simply as "Zork I", was an interactive fiction game published by Infocom [June 22], and the first part in a planned trilogy. It was Infocom's first game, and a massive 378,987 copies were sold by 1986.

The opening text has become somewhat famous:

"You are standing in an open field west of a white house, with a boarded front door. There is a small mailbox here."

Several of the game's situations and descriptions are now iconic within interactive fiction, such as the brass lantern and the "Elvish sword of great antiquity". Zork also introduced the grue, a "sinister, lurking

presence" who kills adventurers who misguidedly risk exploring in the dark.

The first version [May 27] was written in the late 1970's by Tim Anderson, Marc Blank, Bruce Daniels, Dave Lebling, and others at MIT. Members of this group founded Infocom in 1979, and looked around for a money-making project suitable for PCs, such as the TRS-80 [Aug 3] or the Apple III [June 5. Zork was an obvious choice, but it ran on a DECsystem-10, and was too big for PCs of the day, or was it?

Joel Berez and Marc Blank came up with a clever solution: a programming system designed specifically for Zork, which allowed about half of the old Zork to be squashed into 32K bytes of memory and one floppy-disk drive.

Zork was rewritten in this "Zork Implementation Language" (ZIL), which ran on a virtual machine. Each kind of PC hardware ran different versions of this coded using a "Z-machine Interpreter Program" or ZIP.

Although Infocom shut down in 1989, the ZIL, ZIP, and Z-machine did not die. In May 1993, Graham Nelson released the first version of his Inform compiler [April 30], which generated Z-machine files. Inform has since become so popular that a large proportion of all interactive fiction is stored as Z-machine data.

Adobe

Dec. 1982

Adobe Systems was founded by John Warnock [Oct 6] and Charles Geschke [Sept 11] to develop and sell their PostScript page description language. The company began in Warnock's garage, and the Adobe name came from the Adobe Creek that ran behind his house.

Almost immediately, Steve Jobs [Feb 24] tried to buy the company for $5 million, but Warnock and Geschke refused. Instead Jobs had to settle for buying shares worth 19% of the business, and paying a five-year license fee for PostScript. This deal made Adobe the first company in Silicon Valley to become profitable in its first year. By 1987, PostScript had become the industry standard [July 15].

In 1990, Adobe introduced Photoshop [Feb 19] which soon came to dominate the market, followed in 1993 by PDF, the Portable Document Format, and its Adobe Acrobat and Reader. PDF is now an International standard.

Heathkit HERO 1 Released

Dec. 1982

HERO (Heathkit Educational RObot) was a range of educational robots sold by Heathkit [July 00] during the 1980's, either as kits or prebuilt.

The HERO 1 was a small three-wheeled device using an 8-bit Motorola 6808 with 4 KB of RAM. It featured light, sound, and motion detectors, and its base could rotate up to 250 degrees. An optional mechanical arm, speech synthesizer and recognizer were also available.

The Heathkit HERO 1. Photo by Boris Jakubaschk. CC BY-SA 3.0.

Programming was done with a modified BASIC called Androtext via a PC connected though a serial cable. There was also a top-mounted hexadecimal keyboard, a mechanism for recording and playing back motor and arm movements, and a traditional remote control unit. There was even a top-mounted breadboard available so a user could build interfaces to the robot's I/O ports and CPU.

Heathkit published several books of experiments for the HERO 1, and it was possible to earn a Certificate of Achievement by completing them all.

BYTE magazine called the HERO 1 "a product of extraordinary flexibility and function."

ImageWriter Released

Dec. 1983

The Apple ImageWriter was a popular 9-pin dot matrix printer [Oct 00] that was actually a repackaged printer made by C. Itoh Electronics.

Aside from boring old text, the ImageWriter could draw images with a resolution of up to 144 DPI, which permitted it to reproduce WYSIWYG screen output [Sept 17]. This was an important requirement for promoting the Mac GUI [Jan 24] and, later, desktop publishing.

The ImageWriter II was released in Sept. 1985, and stayed in production until late 1996, making it the longest-running Apple product. With an optional networking card, the ImageWriter II was a low cost alternative to the vastly more expensive LaserWriter [March 1]. It could also produce basic color images when a color ribbon was installed [March 20].

The album "A Spectrum of Infinite Scale" (2000), by surf-rock band "Man or Astro-man?" includes the song "A Simple Text File", which is a recording of the sounds made by an ImageWriter II as it prints a file.

ThunderScan

Dec. 1984

Thunderware introduced the ThunderScan, an optical scanner that was installed in place of Apple's ImageWriter ribbon cartridge [prev entry].

The hardware was developed by Victor Bull and Tom Petrie, with software by Andy Hertzfeld [April 6] who was on sabbatical from Apple at the time. For a while, it was both the least expensive (around $200) and the highest quality scanning choice for the Macintosh [Jan 24], although it was far from speedy. Over its lifetime, it sold around 100,000 units.

Quicken 1.0 Released

Dec. 1984

Quicken is a personal finance management tool originally developed by Intuit, Inc. The company was founded in 1983 by Scott Cook and Tom Proulx, after the pair accidentally met outside the Stanford University library. Cook was posting flyers soliciting for a developer, and Proulx was a computer science major looking for work.

Cook's idea was called Kwik-Chek, which he came up with while watching his wife pay bills. As the software's release date approached, Cook headed to a Palo Alto bookstore in search of inspiration for a better name. Under "fast" in a thesaurus he found "quicken". Proulx's response was: "Isn't that when a pregnant woman starts to feel her baby move?"

There were already a number of financial programs on the market, but Cook drew on his background in sales to get Quicken sold through regular retail outlets such as Walmart, which hadn't previously stocked software.

Van Eck Phreaking

Dec. 1985

Van Eck phreaking [Oct 00] is a form of eavesdropping where electromagnetic emissions are picked up from a device, and used to recreate its data. Such signals are generated by keyboards, displays, and printers.

In Dec. 1985, Wim van Eck published the first unclassified technical analysis of the security risks for monitors in "Electromagnetic Radiation from Video Display Units: An Eavesdropping Risk?" One of the nasty results was that successfully observing a real system, at a range of hundreds of meters, could be implemented with just $15 worth of equipment plus a TV set.

Government researchers had been aware of the danger for decades. For example, Bell Labs [Jan 1] had noted the vulnerability to secure teleprinter communications during WWII, being able to produce 75% of the plaintext at a distance of 80 feet.

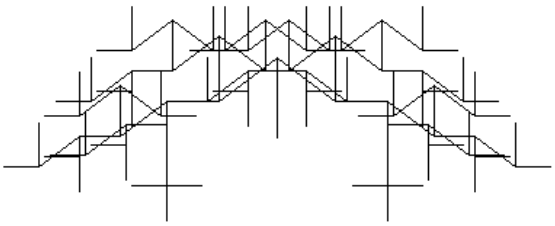
Biomorphs

Dec. 1986

Richard Dawkins' "The Blind Watchmaker" (1986) begins by demonstrating that the evolutionary process – random variation combined with non-random cumulative selection – is quite different from random single-step selection. He does this with the "weasel" program which produces the "METHINKS IT IS LIKE A WEASEL" phrase from "Hamlet". The program must be supplied with a random string, which is "evolved" through "breeding" and by choosing "offspring" strings according to their resemblance to the final phrase. Using these processes, the phrase can be reached in just 40 generations.

Dawkins' weasel was coded in BASIC, but many other implementation can be found online at `http://rosettacode.org/wiki/Evolutionary_algorithm`

Dawkins has acknowledged that "weasel" is an imperfect analogy since evolution doesn't progress toward a goal. Nevertheless he has argued that it still illustrates the significant difference between cumulative selection and pure randomness.



A Biomorph. Photo by Scott Maxwell and Audrius Meskauskas. GPL.

Dawkins' book also describes a more sophisticated graphical model of artificial selection, which could be purchased separately. It displayed a two dimensional shape called a "biomorph" made up of lines where the length, position, and angle of those lines were defined by rules that Dawkins argued were analogous to those used by a genome. These rules added and removes lines, thereby creating a new shape, in a process somewhat akin to mutation. The results were then displayed on the screen, and the user could choose between them, to steer the evolution by "natural" selection.

Another Dawkins' book, "The Selfish Gene", introduced the idea of a "meme" [Nov 15].

Xanadu 2.0 Land Purchase

Dec. 1988

"Xanadu 2.0" is the nickname for Bill Gates' [Oct 28] 66,000 square foot mansion near Redmond. It sits on five acres,

built into a hillside overlooking Lake Washington. It cost over $60 million to build, taking over seven years to finish. The burning question is: why that name?

Most Westerners have heard of Xanadu through the poem "Kubla Khan" by Samuel Taylor Coleridge, which begins:

```
In Xanadu did Kubla Khan
A stately pleasure-dome
decree:
Where Alph, the sacred
river, ran
Through caverns measureless
to man
Down to a sunless sea.
```

Incidentally, Gate's Xanadu contains a 2,100 square foot library with a dome shaped roof. The library is home to the Codex Leicester [Nov 11].

Xanadu was also the name of Charles Foster Kane's estate in the film "Citizen Kane" (1941). The story shows how Kane changes from an idealistic young man into a ruthless tycoon.

Xanadu is also the home of Mandrake the Magician in the long-running comic strip of that name (it began in 1934). His Xanadu is a high-tech mansion atop a mountain in New York State. Hidden behind wall panels in Mandrake's study is the "Crystal Cube", a source of untold power, including the granting of a greatly increased life span (but only if you meditate in front of it each day).

It's also worth recalling that "Project Xanadu" is the name of Ted Nelson's [June 17] hypertext project, begun in 1960.

It is not true that the doormat outside Xanadu 2.0's front door has the word "Start" written upon it rather than the more conventional "Welcome".

Multi-touch Gestures

Dec. 1991

Dean Rubine's thesis was entitled "The Automatic Recognition of Gestures", and introduced a "Rotate-Scale-Translate" gesture which looks very similar to the now ubiquitous smartphone pinch-and-zoom command.

Rubine's demo software ran on CMU's Sensor Frame hardware which had been developed by Paul McAvinney in the mid-1980's. It consisted of a frame of infrared lights that could be slipped over a monitor, and used infrared-sensing to detect when fingers entered the frame. McAvinney had its own version of pinch-and-zoom, a two-fingered "zoom in" and "zoom out" gesture.

Incidentally, the Sensor Frame research was carried out at CMU's "Music Lab", which was visited by Steve Jobs [Feb 24] in Oct. 1985 after he had signed a non-disclosure agreement.

An alternative first for pinch-and-zoom is Myron Krueger's [March 1] Videoplace, also from 1985, although it involved hands not fingers.

A More Circuitous Route

Dec. 1996

Larry Ellison [Aug 17] and Steve Jobs [Feb 24] took a walk during their Christmas vacation in Hawaii. Ellison wanted to discuss taking over Apple, which was worth a mere $5 billion at the time. Ellison's idea was to buy Apple and immediately make Jobs CEO.

Jobs counter-proposed what Ellison later called "a more circuitous route." Ellison should persuade Apple to acquire NeXT [Oct 12], then have Jobs join Apple's board. Ellison recalled that the plan was that "over time the board would recognize that Steve was the right guy to lead the company. I said okay. That might work."

Apple announced its intent to buy NeXT on [Dec 20], 1996. Jobs joined the executive committee as advisor to Gilbert F. Amelio on Feb. 4, 1997. and reclaimed his CEO position on [Sept 16] 1997.

Ellison believes this talk took place in Castle Rock State Park near Los Gatos in 1995; this Christmas date was given in Walt Isaacson's biography of Jobs.

SixDegrees.com Launched

Dec. 1997

Andrew Weinreich's SixDegrees.com was probably the first social network website, in that it allowed site members to list friends, family, and acquaintances. It was modeled on the six degrees of separation concept with users able to send messages and post bulletin board items to people in their first, second, and third degrees. However, they could see their connections to any other user.

At its height, SixDegrees had around 3.5 million members, which actually translated into quite small groups of friends – the essential problem was that not enough people were on the Web at that time.

Other possibilities for "first social network site" are Classmates [Nov 17] and SocialNet.com [Aug 5].

IPv6

Dec. 1998

The IPv4 [Sept 1] Internet protocol supports 32-bit words, so provides only a woefully small 4.3 billion different addresses; it became clear during the 1990's that the supply was rapidly running out. This concentrated the minds of the Internet Engineering Task Force (IETF [Jan 16]), leading to the release of RFC 2460 which defined IPv6.

IPv6 uses 128-bits, increasing the number of addresses to a more comfortable 4×10^{38}. It also adds hierarchical addressing,

simplified message routing, and improved security.

You may wonder why IPv4 was replaced by IPv6 and not IPv5? The number 5 had been employed during the development of the experimental Internet Stream Protocol in 1979, which never caught on. To avoid any confusion, the IETF decided to skip IP from 4 to 6.

IPv4 addresses ran out (for the first time) on [Feb 3] 2011.

Blue Gene

Dec. 1999

IBM announced a $100 million, five-year effort to build a massively parallel computer for the study of biomolecular phenomena such as protein folding. Another aim was to create a machine that could reach speeds in the petaFLOPS range, combined with low power consumption.

The project produced three generations of computers: Blue Gene/L, Blue Gene/P, and Blue Gene/Q [March 2]. Blue Gene systems have often led the TOP500 [June 24] and Green500 rankings of the most powerful and most power efficient supercomputers.

The “L” in Blue Gene/L comes from “Light” as that design’s original name was “Blue Light”. The “P” refers to the petascale design. “Q” is just the letter after “P”, and there is no Blue Gene/R.

Blue Gene/P has been used to simulate approximately 1% of a human cerebral cortex, simulating 1.6 billion neurons with approximately 9 trillion connections.
