March 8th

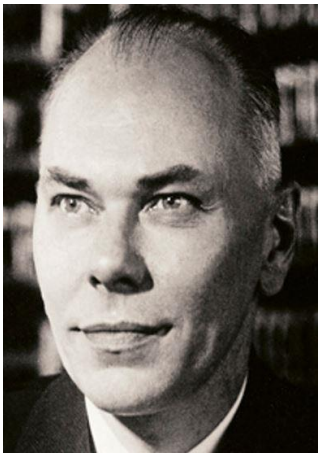
Howard Hathaway Aiken

Born: March 8, 1900;

Hoboken, New Jersey
Died: March 14, 1973

Aiken was the conceptual designer of IBM's Harvard Mark I [Aug 7], which grew out of his need to solve a large number of nonlinear differential equations in the late 1930s. He realized that these calculations could be done much faster, and with less errors, by a machine.

On April 22, 1937, he approached the Monroe Calculating Machine Company [April 25] with his ideas, but after a few months of discussions, they turned him down. Aiken had better luck when he turned to his university, Harvard, for funding [Jan 17]. This led to a contract with IBM [March 31] to build the Automatic Sequence Controlled Calculator (ASCC) [April 17], which was later renamed the Harvard Mark I.



Howard Aiken. Univ. of St. Andrews.

Aiken founded the Harvard Computational Lab in 1947, and was involved in the creation of the Mark II relay machine (1946), the partially electronic Mark III (1950), and the fully electronic Mark IV (1952). The Mark III and Mark IV used drum storage, and the Mark IV employed core memory.

Aiken is sometimes remembered for his 1947 prophecy, "Only six electronic digital computers would be required to satisfy the computing needs of the entire United States." Unfortunately, there's no evidence that he ever said it. In this he joins the ranks of Thomas Watson [Jan 14] and Ken Olsen [Feb 20].

As an undergraduate, he took a night job with the Madison Gas and Electric Company as a switchboard operator, a job that bored him so much that he took up knitting socks to pass the time.

A quote: "Don't worry about people stealing an idea. If it's original, you will have to ram it down their throats."

Ralph Henry Baer

Born Rudolf Heinrich Baer

Born: March 8, 1922;

Rodalben, Germany
Died: Dec. 6, 2014

In Sept. 1966, Baer began to explore the possibility of displaying games on TV screens, and over the next three years Baer, Bill Harrison, and Bill Rusch, created several prototype consoles. "Early in 1967," Baer recalled, "we had the most basic ball-and-paddle games working. By September we were playing hockey games that were rather fancy, meaning the ball motion was complicated."

The seventh prototype, known as the "Brown Box", could play a variety of games by flipping different switches along the front of the unit. They included ping-pong, checkers, target shooting with a light gun, and a golf-putting game which required a special attachment. The "Brown Box" was so named because of the brown tape wrapped around it and its two controllers which was meant to suggest stately wood veneer.

In an early meeting with a patent examiner, Baer showed off a prototype by connecting it to a TV in the man's office and remembered, "within 15 minutes, every examiner on the floor of that building was in that office wanting to play the game".

On March 3, 1971, the Brown Box was licensed to Magnavox, and, after being renamed the Magnavox Odyssey, was released on [May 2] 1972. This made it the first home video game console, and over 200,000 units were sold.

In later years, a lengthy conflict developed between Baer and Nolan Bushnell [Feb 5] of Atari [June 27] over who was the true "father of video games"; Bushnell's claim rested on Atari's release of the Pong arcade game on [Nov 29] 1972. Ultimately, the industry named Baer the "father of the home video game console", and crediting Bushnell with creating the arcade game.

Another Baer invention (developed with Howard Morrison) was Milton Bradley's Simon, a popular 1980's game that challenged players to reproduce sounds by pressing colored buttons.

On June 15, 2021, the US Mint released a commemorative $1 coin in its New Hampshire American Innovation series celebrating Baer. This was a first for the Mint, which had never before struck a coin honoring video games or a game developer. The coin deliberately looks something like an arcade token, and has a drawing of a Brown Box game handball on one side.

Gerard A. (Gerry) Salton

Born Gerhard Anton Sahlmann

Born: March 8, 1927;

Nuremberg, Germany
Died: Aug. 28, 1995

Salton developed the widely used vector space model, thereby becoming the "father of Information Retrieval" (IR). The model represents documents and queries as vectors of term counts, and their similarity as

the cosine of the angle between those vectors. Salton also invented TF-IDF (term-frequency inverse-document frequency) which reflects how important a word is to a document. It's often used as a weighting factor in IR searches and text mining.

In the early 1960's Salton designed SMART (System for the Mechanical Analysis and Retrieval of Text) which became a test-bed for the evaluation of different IR techniques. Despite the official name, most people claim SMART stood for "Salton's Magical Automatic Retriever of Text."

After the collapse of machine translation research in the US at the end of the 1960's following the ALPAC [April 00] report, Salton was one of the few people to continue working in the area.

Salton was the last of Howard Aiken's [two entries ago] PhD students at the Harvard Computation Lab in the 1950's.

Michael Stern Hart

Born: March 8, 1947;

Tacoma, Washington
Died: Sept. 6, 2011

On July 4 1971, inspired by the US Declaration of Independence, Hart founded Project Gutenberg (http://www.gutenberg.org), now the oldest and largest digital library of free books. He had received a copy of the document for free at a local grocery.

Fred Ranck supplied Hart with an account on a Xerox Sigma V [July 21] in the Materials Research Lab at the University of Illinois, and he set about typing in the Declaration's text (all in uppercase because the terminal lacked lowercase keys). Hart's plan was to send it as e-mail to everyone on the ARPANET [July 29] (about 100 people). Fortunately, Ranck persuaded him that so many messages would crash the system, and upset people. Instead, Hart posted a brief note that the text was available in a downloadable file; six users took him up on the offer (i.e. 6% of the ARPANET).

Hart chose the Gutenberg name to emphasize its parallels to Johannes Gutenberg's printing press for disseminating knowledge.

Hart's tenth book was the "King James Bible", which went online in Aug. 1989. The first work of fiction was "Alice's Adventures in Wonderland".

Around this time, Hart was invited to place his growing digital collection under the protection of the Benedictine University, a Roman Catholic seminary in Lisle, Illinois. The monks also awarded Hart an annual salary to support his work.

Michael Stern Hart (2006). Photo by "Marcello". CC BY-SA 3.0.

By Aug. 1997, Hart had uploaded around 1,000 books, with the pace picking up through the help of volunteers. Today, Project Gutenberg lists over 60,000 books in 60 languages. Supposedly, the most downloaded one, by a large margin, is the "Kama Sutra". However, Project Gutenberg's own statistics places it at 85th in early 2021.

A quote from Hart: "Reasonable people adapt themselves to the world. Unreasonable people attempt to adapt the world to themselves. All progress, therefore, depends on unreasonable people."

Whirlwind Director

March 8, 1955

Doug Ross [Dec 21] demoed the "Director Tape" (aka the Director), a Job Control Language for the Whirlwind [April 20], and arguably the first OS. The demonstration used Director to run a complex aircraft bomber targeting system. It loaded data into the Whirlwind's drum storage, initialized hardware, and executed several programs.

The Director tape was assigned its own Flexowriter tape reader, while other Whirlwind programs were read by a faster photoelectric reader when instructed to by the Director.

John Frankovich and Frank Helwig, who were members of Charles Adams's [Feb 6] Science and Engineering Computation Group at MIT, had implemented the software.

Another candidate for first OS is GM-NAA I/O [June 11] for the IBM 704 [May 7], which w0 as also developed in 1955.

Archimedes Cattle

March 8, 1965

Archimedes' cattle problem begins: "If thou art diligent and wise, O Stranger, compute the number of cattle of the Sun which once grazed upon the plains of Sicily."

If the colorful language is stripped away (which is a shame), the problem requires the solution of seven equations involving the integers W, B, D, Y (the number of white, black, dappled, and yellow *bulls*) and w, b, d, y (the number of white, black, dappled, and yellow *cows*), such that:

```
W = (5/6)B+Y
B = (9/20)D+Y
D = (13/42)*W+Y

w = (7/12)(B+b)
b = (9/20)(D+d)
d = (11/30)(Y+y)
y = (13/42)(W+w)
```

The required answer is the sum:

```
W+B+D+Y+w+b+d+y
```

The smallest solution in integer form is

```
W = 10,366,482
B = 7,460,514
D = 7,358,060
Y = 4,149,387

w = 7,206,360
b = 4,893,246
d = 3,515,820
y = 5,439,213
```

This makes the total a whopping **50,389,082** cattle, but that's only 10 cows per Sicilian.

A more complicated version requires that W+B be a square number (i.e. n^2) and D+Y a triangular number (of the form n(n+1)/2 for some integer n).

An approximate answer for this harder problem is 7.76×10^{206544}, which was first calculated by A. Amthor in 1880, having reduced it to a form called a Pell equation.

In 1931, *The New York Times* reported: "Since it has been calculated that it would take the work of a thousand men for a thousand years to determine the complete number [of cattle], it is obvious that the world will never have a complete solution."

On this day, H. C. Williams, R. A. German, and C. R. Yarnke at the University of Waterloo in Canada proved the newspaper wrong. They used an IBM 7040 and 1620 [Oct 21] to produce a solution occupying 42 sheets of paper. It took 7 hours and 49 minutes of computing time.

In 1981, Harry Nelson repeated the calculation using a Cray-1 [March 4], obtaining the result in ten minutes.

The iPhone 11 [Jan 9] is probably 2,000 times faster than the Cray-1 (a conservative estimate), which suggests that today the problem could be solved in less than half a second. Certainly, the basic problem can be solved in Python [Jan 31], with the help of sympy (a symbolic math library), in a second on an ordinary PC.

Don't Panic

March 8, 1978; 10:30pm

The first radio episode of "The Hitchhiker's Guide to the Galaxy" (abbreviated HHGTTG or H2G2), by Douglas Adams [March 11], was transmitted on BBC Radio 4. There were six episodes altogether, of thirty minutes each.

The story follows the misadventures of Arthur Dent following the demolition of the planet Earth by a Vogon constructor fleet to make way for a hyperspace bypass. It introduced the world to Vogon Poetry, the computer "Deep Thought", the true meaning of the number 42, Marvin the Paranoid Android, the phrases "Don't Panic", "So Long and Thanks for All the Fish", the Pan-Galactic Gargle Blaster, the BabelFish, and many more.

Adams said a few times that the idea for H2G2 came to him in 1971 when he was hitchhiking around Europe with a copy of 'The Hitchhiker's Guide to Europe". Drunk one night, he found himself lying in a field near Innsbruck. Looking up at the stars, he thought it would be a good idea for someone to write a hitchhiker's guide to the galaxy. However, he's also noted that because he's told this story so many times, he no longer remembers the actual event, just the numerous retellings.

Another popular date for commemorating H2G2 is May 25 ("Towel Day"), when fans pay tribute by carrying towels. According to the Guide (Chapter 3), a towel is the "most massively useful thing an interstellar hitchhiker can have" not only for its practical uses but its psychological value.

For more Guide references, see [June 28], [July 1], [July 24], [Sept 15], [Oct 4], [Dec 5]

IBM PC XT and PC DOS 2

March 8, 1983

IBM introduced the PC XT (aka the IBM 5160) featuring an Intel 8088 processor, a 10 MB hard drive, eight expansion slots, 128-256 KB of RAM, and a double-sided 360 KB floppy drive.

An IBM PC XT. Photo by Ruben de Rijcke. CC BY 3.0.

The "XT" stood for eXtended Technology but, apart from the hard drive, was essentially the same as the original PC [Aug 12].

The most interesting changes were in the software. The machine ran PC DOS 2.0, a complete overhaul of the first release [Aug 12] that was twice the size, requiring a whopping 24 KB of RAM. It would have been three times bigger, but IBM pressured Microsoft into reducing its memory requirements.

Many of its features were derived from UNIX [Oct 15], including background printing, I/O redirection, pipes, and a hierarchical file system. A clever new nine-sector data format increased the capacity of floppy disks by 12%. The OS also introduced support for device drivers – the first step towards plug-and-play. It also added the equivalents of C's malloc(), free(), and realloc() in its syscalls, making the implementation of Terminate and Stay Resident (TSR [June 00]) programs much more feasible.

The principal developers at Microsoft were Paul Allen [Jan 21], Mark Zbikowski [March 21], and Aaron Reynolds, and took ten months to code.

IBM PC compatible makers, such as Compaq, quickly started licensing this version.

Cracking a DVD in Seven Lines

March 8, 2001

Keith Winstein and Marc Horowitz wrote seven lines (472 bytes) of Perl to strip encryption from DVDs. The program, qrpff, went through 77 versions to become a coding pearl.

The qrpff tie. The Digital Group.

The pair also wrote the 531 byte qrpff-fast that was speedy enough to crack and play a DVD in real time.

qrpff was a compact cousin of the DeCSS utility that caused eight movie studios to sue 2600 magazine [Jan 12]. DeCSS was written by DVD Jon (aka Jon Lech Johansen). However, qrpff didn't violate the Digital Millennium Copyright Act [Oct 28], because it lacked the five-byte decryption key which meant it was protected from lawsuits. But once the key was supplied, it was very easy to play a movie, as the following Linux snippet shows:

```
cat movie.vob |
perl -I 254:16:32:48:205
qrpff |
extract_mpeg2 | mpeg2dec -
```

The source code for qrpff, printed on a blue necktie, was sold for $2,500 at The Algorithm Auction [March 27].

While still at high school, Keith Winstein was responsible for "Tyrannosaurus Lex" – software that could hide a secret message in a document.

E-Book Ruling

March 8, 2002

In the case of Random House vs. Rosetta Books, Judge Sidney H. Stein ruled that e-books did not violate Random House's exclusive rights to publish written works. This judgment paved the way for authors to publish their work electronically, independently of major publishers.

Random House had filed the suit against e-book start-up Rosetta Books for acquiring titles directly from authors (specifically from Robert B. Parker, William Styron, and Kurt Vonnegut), circumventing the publishing house. The court was unimpressed, stating that Random House's own dictionary defined a 'book' as 'a written or printed work ... usually on sheets of paper'.

The Game Canon

March 8, 2007

Henry Lowood, curator of "The History of Science and Technology Collections" at Stanford University, announced the first game canon. Lowood had been helped by a four-member committee — the game designers Warren Spector and Steve Meretzky; Matteo Bittanti, an academic; and Christopher Grant, a games journalist.

The canon, chronologically:

- Spacewar! ([May 17]1962);
- Star Raiders ([Nov 00] 1979);
- Zork ([May 27] 1979);
- Tetris ([June 6] 1984);
- SimCity ([Feb 2] 1989);
- Super Mario Bros. 3 ([Sept 13] 1990);
- Civilization I/II ([Feb 24] 1991);
- Doom ([Dec 10] 1993);
- The Warcraft series [Nov 23] (beginning 1994);
- Sensible World of Soccer ([June 10] 1994).