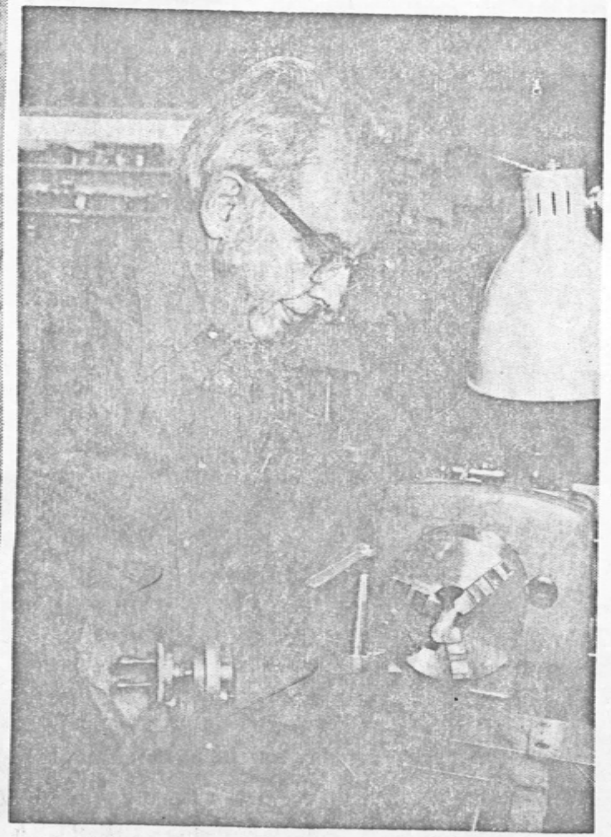
The Washington Post OUTLOOK Editorials / Columnists

SUNDAY, JANUARY 13, 1974 B1

THE COMPUTER: BORN IN A TAVERN



By Tom Molesworth

Dr. Atanasoff at work on project in Frederick, Md.

By W. David Gardner

Gardner is industry editor for Datamation, a monthly magazine which covers the data processing field.

WHAT HENRY FORD was to the Model T and the automotive industry and Wilbur and Orville Wright were to the Kitty Hawk and the airplane industry, so were Dr. J. Presper Eckert and Dr. John W. Mauchly to the ENIAC and the computer industry.

The ENIAC (an acronym for electronic numerical integrator and computer) was the creation of Eckert and Mauchly in the mid-1940s and has been almost universally acclaimed as the world's first automatic electronic digital computer in the folklore of the computer industry, by professional computer societies and by industry textbooks.

Over ice cream sundaes and coffee in a Philadelphia restaurant, so the standard version goes, Eckert and Mauchly worked out the concept that has made possible today's vast complexes of electronic data processing (EDP) machinery.

A new version has come to light now, however, with the added authority of a court decision in a major patent case. The Eckert-Mauchly patent on the ENIAC, in the ruling of U. S. District Court Judge Earl R. Larson of Minnesota, is invalid.

Dr. Mauchly, Larson decided, had learned the basic concept from another scientist, Dr. John Vincent Atanasoff, whom Mauchly had visited at Iowa State College in the early 1940s. Atanasoff's testimony in the patent case relocated the genesis of ENIAC from the Philadelphia restaurant to a tavern on the Illinois side of the Iowa border.

Frustrated Over Design

ATANASOFF had been working in his laboratory in Ames, Iowa, in the winter of 1937-38, he testified, when he became frustrated by his inability to finish designing an advanced computing device which he had been working on for several months. He jumped into his car, drove off in the direction of the Illinois border and after a few hours on the road came to the tavern. He recalled what happened in testimony before the court:

"I had a very heavy coat, and hung it up and sat down and ordered a drink, and as the delivery of the drink was made, I realized that I was no longer nervous and my thoughts turned again to computing machines.

"Now, I don't know why my mind worked then when it had not worked previously, but things seemed to be good and cool and quiet . . .

"During this evening in the tavern, I generated within my mind the possibility of the regenerative memory . . .

"During that same evening, I gained an initial concept of what is called today the 'logic circuits' . . ."

Atanasoff's testimony came during a 135-day trial resulting from a charge by Sperry Rand that Honeywell, Inc., had infringed on Sperry Rand's ENIAC patents, which the predecessor of its Univac computer division had obtained from Eckert and Mauchly in 1950. In response to the suit, which at times had asked for as much as $250 million for patent rights, Honeywell filed an anti-trust suit against Sperry Rand. It was the latter action on which Judge Larson made his ruling.

During the trial, Judge Larson learned a great deal about the ENIAC and he discussed this in a decision he issued in October and which has become known to the public only in the past few days (initially in an article in Datamation magazine.

The judge in effect found a new "father" of the automatic electronic digital computer, which in the context of the computer industry is akin to finding a new father of electricity to replace Thomas Edison. Atanasoff, now 70 and a resident of Frederick, Md., for more than 15 years, was a member of the faculty at Iowa State College until 1942.

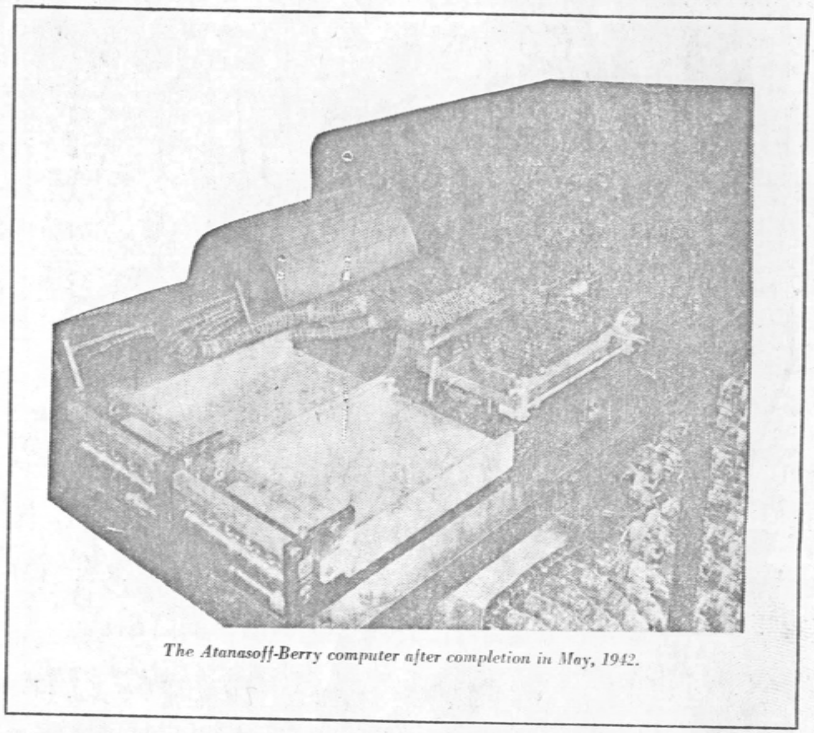
Sword of Damocles

FOR YEARS, the ENIAC patent was a veritable sword of Damocles held over developing young computer companies. Sperry Rand and IBM had entered into a secret cross-patenting agreement in 1956 so those two firms, which had 95 per cent of the computer industry at the time their pact was signed, were not concerned about the ENIAC patent.

Other computer firms, however, had to worry about royalty suits over the ENIAC. And, as it turned out, their fears were not unfounded: In 1967 Sperry selected Honeywell as a test case.

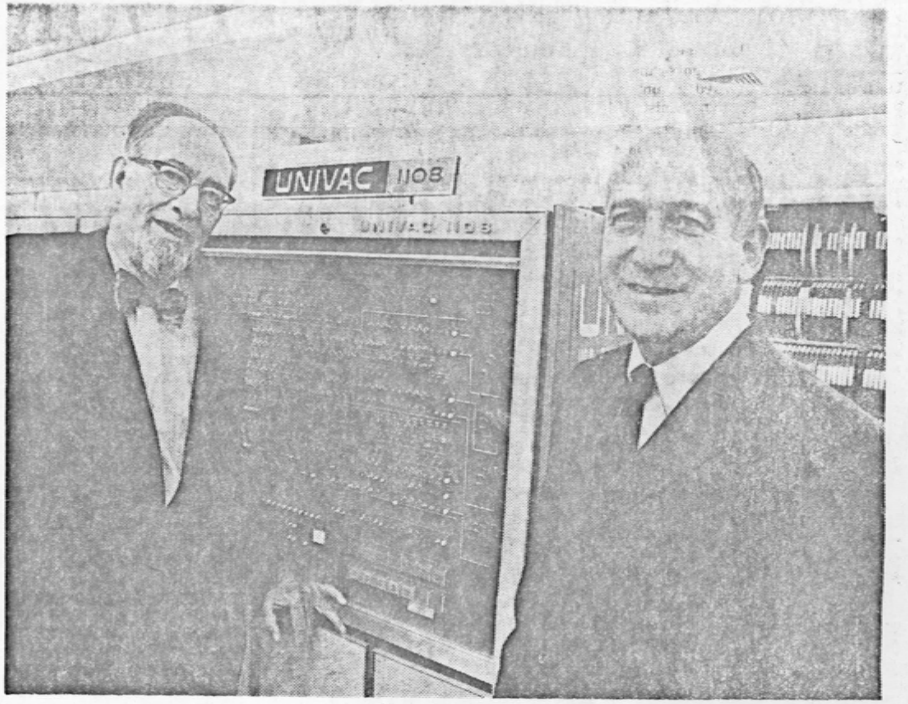
In its patent case against Honeywell, Sperry Rand had maintained that the ENIAC patent is "the invention of the automatic electonic digital computer." In addition, Sperry Rand claimed that "no data processing machine of any consequence . . . in the United States today is being made that does not make use of inventions covered by this patent."

See COMPUTER, Page B2



The Atanasoff-Berry computer after completion in May, 1942.

ENIAC, developed for the U.S. Army, was placed into operation in November, 1945.



By W. C. Baker

Drs. Mauchly, left, and Eckert stand in front of one of UNIVAC's modern computers.

Age of Computers: How It Began

COMPUTER, From Page B1

But some problems loomed. The biggest of these was Atanasoff. He was the pivotal figure.

If Atanasoff were the real inventor of the computer or, more important, had invented the basic concepts and design utilized in the ENIAC, then the ENIAC patent would be invalid. Judge Larson said that both Sperry and IBM knew of Atanasoff's work and that both firms covered it up in patent litigation.

30 Years of Records

OTHER computer companies, however, did not know of his work, so they had no way of knowing that the ENIAC was derived from an earlier machine.

Atanasoff had lost contact with the computer industry when he went to work at the Naval Ordnance Laboratory during World War II. Later he drifted into defense-related scientific research and business. By the time the computer industry got wheeling in the late 1950s and early 1960s he was out of touch. Furthermore, his close associate at Iowa, Clifford Berry, had died in 1963 (his death was recorded as a suicide), leaving Atanasoff as the sole figure from Iowa State College who could claim the invention of the automatic electronic digital computer.

During the trial, Atanasoff testified on behalf of Honeywell. "I have an excellent memory," says Atanasoff. "And I keep good files. Who would keep papers and letters and notes for 30 years? Why, Atanasoff would."

In the end, much of the patent issue boiled down to a case of its being Atanasoff's word against that of Eckert and Mauchly. Judge Larson found Atanasoff's testimony more credible.

In his decision, Judge Larson also invalidated the ENIAC patent on the issue of "public use." The ENIAC was in public use more than one year before the patent application was filed; patents are invalid when the invention has been in use more than one year prior to that date.

The ENIAC, which had been developed at the University of Pennsylvania for the U.S. Army, was placed in operation as a system in mid-November, 1945, and its patent application was filed on June 25, 1947.

Helped Develop H-Bomb

PRIOR TO the trial, the ENIAC had been thought to have been used by the Army primarily to calculate trajectories and firing tables for missile work, but testimony revealed that the ENIAC played a big role in the development of the hydrogen bomb. Dr. Edward Teller testified in the case on the use of the ENIAC in connection with work on the hydrogen bomb at the Los Alamos lab. The work on the H-bomb was performed on the ENIAC more than a year before the patent application was filed.

The judge summed up Teller's testimony by stating: "The result of the

occupants of the field was fraught with antitrust difficulties. McNamara of SR stated that an exchange of EDP know-how would give rise to antitrust problems . . ."

When IBM and Sperry Rand signed their "technological merger" pact, IBM suddenly found itself in an awkward position. It now had access to the ENIAC patent, but, since it had already filed litigation against Sperry Rand over the ENIAC patent, it had to go through the motions of pursuing the suit. The company took an interesting approach to the problem: IBM faked it.

IBM's deliberately feeble proceeding against the ENIAC patent was rejected by the U.S. Patent Office in 1959. Judge Larson said, "IBM and SR knew the Patent Office proceeding was essentially a sham."

The judge said that when IBM proceeded with its petition against the ENIAC patent, the firm withheld crucial information it had regarding the "public use" issue and Atanasoff's work.

IBM had known about Atanasoff for years. In 1940, Atanasoff was visited at Iowa State College by an IBM engineer. Later that year, Atanasoff visited IBM's director of market research, who was in charge of examining new inventions and ideas. Atanasoff said he

Berry, visited the U.S. Patent Office and transcripts of the case depict Atanasoff and Berry fumbling through voluminous piles of papers and documents in an attempt to make sense of previous patents in the calculating area so they could file one of their own.

"I wasn't possessed with the idea I had invented the first computing machine," said Atanasoff. "If I had known the things I had in my machine I would have kept going on it."

Negligible Gains

WHILE ATANASOFF realized no monetary gain from his pioneering work with computers, Mauchly says that his and Eckert's financial gain from the ENIAC patent was "negligible," and much of that gain went to tax attorneys. (The ENIAC patent affair seemed to be a boon only to attorneys, who divided up millions of dollars in fees.)

Even Judge Larson indicated that Sperry Rand was not always overly generous with Eckert and Mauchly. "Contemporaneous documents, however," the judge stated, "indicate that IBM's license under the ENIAC patent rights was claimed by SR at a value equal to 1 per cent of IBM's EDP equipment manufacturing cost for the years 1957-64; although SR represented in negotiations with Eckert and Mauchly that only 2 per cent of the IBM 1956 agreement royalty of $10 million (or $200,000) was attributable to the license under the ENIAC patent rights."

Thus, when dealing with IBM, Sperry Rand was claiming the ENIAC patent was worth more than $150 million; when Sperry Rand dealt with Eckert and Mauchly on the same issue, the figure was lowered to $200,000.

The whole matter says something about the patent laws of the land. It is often predicted that the computer industry will surpass the auto industry as the largest in the world by 1980. Yet the man now established as the inventor of the computer couldn't slice through the patent application maze to the point where he could even file a patent application, and the men who did file the patent application for the invention of the computer, it has been ruled, didn't invent it. Worse, if one accepts Judge Larson's decision, the patent issue was used by the two dominant firms in the industry to stifle competition and retard the growth of the entire industry.

But there is hope in the U.S. Patent Office. The agency's $25-million plan to computer-automate itself—a program called Project Potomac—has been axed.

Nevertheless there is a feeling in the Patent Office that one day it will be automated. This may be way off in the future, of course, but one day it will be computerized.

And one day someone in the Patent Office will ask the agency's automatic electronic digital computer who invented the automatic electronic digital computer. And the computer will reply back that the computer wasn't invented because it can't find the patent.

cellent memory," says Atanasoff. "And I keep good files. Who would keep papers and letters and notes for 30 years? Why, Atanasoff would."

In the end, much of the patent issue boiled down to a case of its being Atanasoff's word against Mauchly's word. Judge Larson decided he liked Atanasoff's word and stated in his decision: "The court has heard the testimony at trial of both Atanasoff and Mauchly, and finds the testimony of Atanasoff with respect to the knowledge and information derived by Mauchly to be credible."

The judge observed that Mauchly visited Iowa State College as a house-guest of Atanasoff and examined Atanasoff's computer and a manuscript describing its design. Noting that "no significant information concerning the machine's theory, design, construction, use or operation was withheld" from Mauchly, Judge Larson concluded by stating: "Eckert and Mauchly did not themselves first invent the automatic electronic digital computer, but instead derived that subject matter from one Dr. John Vincent Atanasoff."

Contacted at his home near Philadelphia, Mauchly, still a consultant for Sperry Rand, said he disagrees with the judge's decision. As for Atanasoff's work, Mauchly said he never regarded Atanasoff's machine to be "automatic" or much more than "a little gizmo."

Atanasoff's machine never got beyond the experimental stage, although Atanasoff says all the important computing elements in the machine were operating when the press of the war drew him to the Naval Ordnance Laboratory.

Four Concepts

ATANASOFF is a theoretical physicist who became chief of the acoustic division at the Naval Ordance Laboratory. Later he directed the Navy's Fuze program and he also served as chief scientist of the U.S. Army field forces.

Although he never made a penny from his computer work, he is financially comfortable. He started his own firm in the early 1950s, built it up to the point where it had annual sales of $750,000, and sold it to Aerojet General, where he later became a vice president. In recent years his primary effort has been an effort to develop a new alphabet, which he thinks, like his computer machine, has revolutionary concepts.

Atanasoff believes he incorporated four unique and inventive concepts in his machine—regenerative memory, logic circuitry, serial calculation and the digital approach to calculation in which base 2 numbers, rather than the standard base 10 numbers, are utilized.

In spite of Judge Larson's invalidation of the ENIAC patent, the machine itself will continue to occupy a lofty position in the history of the computer. The ENIAC was in productive use for more than 10 years, being turned off for the last time in October, 1955.

Alamos lab. The work on the H-bomb was performed on the ENIAC more than a year before the patent application was filed.

The judge summed up Teller's testimony by stating: "The results of the Los Alamos calculations using the ENIAC machine were included in three Los Alamos reports which show or state in substance that without the ENIAC machine, important work on nuclear energy release problems could not have been done at the time. The court concurs with Dr. Teller that one of the reports in April, 1946, delivered a verdict on the feasibility of a thermonuclear bomb: Difficult, but with hard work and concentrated effort hopeful."

But the biggest surprise of all that came out of the litigation between Honeywell and Sperry Rand was the disclosure of a secret "technological merger" between Sperry and IBM. One interesting wrinkle was the fact that top Justice Department officials were informed of the 1956 pact and, as Judge Larson stated, treated it as "confidential."

The judge, though, said the pact was "an unreasonable restraint of trade and was an attempt by IBM and SR (Sperry Rand) to strengthen or solidify their monopoly in the EDP industry." Judge Larson referred to the agreement between IBM and Sperry Rand as a "technological merger," and said it was "stifling to the remainder of the then emerging electronic data processing industry."

The "technological merger" was not without its problems for the companies involved, particularly IBM. "IBM's top management," the judge said, "indicated a concern that the largest patent license deal in history would not be well received by the public."

That problem was neatly solved when IBM and Sperry Rand issued a press release that covered up the true facts of the pact.

"By issuing the jointly drafted press release" the judge stated, "SR and IBM appeared to disclose the nature of their settlement, but the press release did not contain enough information to make it self-explanatory nor to prevent it from being misleading as to the true content of the technological merger; the press release was calculated to allay suspicions which the conspirators knew would follow the inevitable leak of information about the deal."

Antitrust Problems

AND THERE were antitrust fears (These later proved to be well-founded when Judge Larson ruled that the IBM-Sperry Rand pact was in restraint of trade. Because of the statute of limitations, however, antitrust charges filed by Honeywell against Sperry Rand were dismissed.)

In his decision, Judge Larson said, "Judge (Bruce) Bromley, outside counsel of IBM, stated that the proposed settlement between the two principal

Iowa State College by an IBM engineer. Later that year, Atanasoff visited IBM's director of market research, who was in charge of examining new inventions and ideas. Atanasoff said he attempted in vain to interest IBM in his computing device. IBM wasn't interested, Atanasoff said, adding that he remembers receiving a letter from IBM stating the firm would never use an electronic digital computer in its business.

Sperry Rand's predecessor, Remington Rand, was even more blase about Atanasoff's efforts to convince the firm that electronic computing devices were the wave of the future.

Was it possible, Atanasoff was asked, that IBM and Remington Rand were deliberately stringing him along?

"No," said Atanasoff, "I just believe they were too damned dumb to know what was happening. They didn't know what was revolving around them. They thought they had the world by the tail and I guess they did, but for different reasons than they thought."

Offer Rejected

IN WHAT has to be an historically important document in the computer industry, Atanasoff wrote Remington Rand on April 6, 1940:

"I have made and am making some developments in the computing machine art which may be of interest to you since they apply rather specifically to tabulating machines. I believe my developments will enable one to build a computing machine which will perform all the operations of the standard tabulators and many more at much higher speeds and at a much lower cost of construction."

Thanks, but no thanks, said Remington Rand.

Years later, in the late 1950s, the firm was eagerly chasing after Atanasoff, trying to get at his records, copy his records, talk to his friends, pick his mind—anything that would shed light on the work Atanasoff had so desperately been trying to explain to them years before.

Frederick, Md., became something of a way station for computer patent attorneys. One attorney came with John W. Mauchly, who, as already noted, had visited Atanasoff years before in Ames. Mauchly was seeking information again, this time in connection with the then-to-come Sperry Rand-Honeywell litigation.

Mauchly says the meeting was "affable" and Atanasoff says, "John Mauchly and I are still pretty good friends." Neither scientist wanted to be dragged into the case by the firms' lawyers.

Atanasoff had hoped to file a patent for his computer but the war intervened and he got caught up in snarls with Iowa State College, which held rights to his work. Numerous discussions and negotiating sessions with patent attorneys and college officials were held but no patent application ever was filed.

Atanasoff and his associate, Clifford