

The TV Tech Tussle

-- At least three flat-screen technologies are vying to replace the boxy television set as TV makers accelerate their biggest design change since they replaced black-and-white with color. --

BACKGROUND:

When Guglielmo Marconi, the Irish-Italian inventor, came to the United States in 1899 to demonstrate how his wireless telegraph might expedite press coverage of the America's Cup races, the concept of broadcasting had not entered his mind at all. He thought his device, which sent Morse code messages without connecting wires, would be useful for corporate clients who needed a rapid, mobile communications system. His American competitors, however, sought to expand the invention's applications and to use it to transmit music and voice. On Christmas Eve, 1906, Reginald Fessenden sent out a program of music and speech. Lee de Forest, inventor of the radio tube, attempted to broadcast synthesized music and opera in New York City between 1907 and 1909. By the next decade, amateur operators were broadcasting speech, music, and coded messages in dozens of cities.

Although experimentation with television broadcasting began in the late 1920s, technical difficulties, corporate competition, and World War II postponed its introduction to the public until 1946. Television constituted a revolutionary change from radio, but its introduction was not as chaotic as that of radio, for an institutional framework already existed. The television boom occurred between 1949, when 940,000 households had a set, and 1953, when the number soared to 20 million.

The modern scanning process, which is the essence of television accomplishment, operates as

do the eyes in reading a page of printed matter, i.e., line by line. A complex circuit of horizontal and vertical deflection coils controls this movement and causes the electronic beam to scan the back of a mosaic of photoelectric cells in a 525-line zigzag 30 times each second. (The 525-line 30-frame-per-second system is used in the United States, Japan, and elsewhere; many other countries use similar but incompatible systems.) Because of persistence of vision only about 30 pictures need be transmitted each second to give the effect of motion. The development of interlaced scanning results in alternate lines being scanned each 1/60 sec, the remaining lines being covered in the next 1/60 sec.

V. K. Zworykin's iconoscope (1923) was the first successful camera tube in wide use. Its functioning involved many fundamental principles common to all television image pickup devices. The face of the iconoscope consisted of a thin sheet of mica upon which thousands of microscopic globules of a photosensitive silver-cesium compound had been deposited. Backed with a metallic conductor, this expanse of mica became a mosaic of tiny photoelectric cells and capacitors. The differing light intensities of various points of a scene caused the cells of the mosaic to emit varying quantities of electrons, leaving the cells with positive charges proportionate to the number of electrons lost. An electron gun, or scanner, passed its beam across the cells. As it did so, the charge was released, causing an electrical signal to appear on the back of the mosaic, which was connected externally to an amplifier. The strength of the signal was proportional to the amount of charge released. The iconoscope provided good resolution, but required very high light levels and needed constant manual correction.

The orthicon and image-orthicon camera tubes improved on the iconoscope. They used

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light-sensitive granules deposited on an insulator and low-velocity scanning. These could be used with lower light levels than required by the iconoscope, and did not require the constant manual manipulation. The vidicon was the first successful television camera tube to use a photoconductive surface to derive a video signal.

Solid state imaging devices were first demonstrated in the 1960s. Today's solid-state television cameras use semiconductor charge-coupled devices or CCDs. Each element in a CCD stores a charge that is determined by the illumination incident on it. At the end of the exposure interval, the charge is transferred to a storage register and the CCD is freed up for the next exposure. The charges in the storage register are transferred to the output stage serially during that time. Although almost all consumer video cameras and camcorders use CCD imagers, camera tubes are still common in professional applications.

In the television receiver, the original image is reconstructed essentially by reversing the operation of the video camera. The final image is typically displayed on the face of a cathode-ray tube, where an electron beam scans the fluorescent face, called the screen, line for line with the pickup scanning. The fluorescent deposit on the tube's inside face glows when hit by the electrons, and the visual image is reproduced. Liquid crystal displays have also been used, mainly on small, portable sets; they are also finding increasing use as light valves on large-screen projectors. Although LCD technology is advancing rapidly, video projectors that use electron tubes can still produce better pictures. Other devices in the receiver extract the crucial synchronization information from the signal and demodulate (separate the information signal from the carrier wave) it.

Several systems of color television have been developed. One system, a simultaneous compatible system, was developed by the Radio Corporation of America (RCA). In 1953 the FCC reversed its 1950 ruling and revised the standards

for acceptable color television systems. The RCA system met the new standards (the CBS system did not) and was well received by the public. This system is based on an element-sequential system. Light from the subject is broken up into its three color components, which are simultaneously scanned by three pickups. However, the signals corresponding to the red, green, and blue portions of the scanned elements are combined electronically so that the required 4.1-MHz bandwidth can be used. In the receiver the three color signals are separated for display. The elements, or dots, on the picture tube screen are each subdivided into areas of red, green, and blue phosphor. Beams from three electron guns, modulated by the three color signals, scan the elements together in such a way that the beam from the gun using a given color signal strikes the phosphor of the same color. Provision is made electronically for forming proper gray tones in black-and-white receivers. The FCC allowed stereo audio for television in 1984.

Television programs may be transmitted either live or from a recording. The principle means of recording television programs for future use is videotape recording. Videotape recording is similar to conventional tape recording except that, because of the wide frequency range-4.2 megahertz (MHz)-occupied by a video signal, the effective speed at which the tape passes the head is kept very high. The sound is recorded along with the video signal on the same tape.

When a television program is broadcast, the varying electrical signals are then amplified and used to modulate a carrier wave; the modulated carrier is usually fed to an antenna, where it is converted to electromagnetic waves and broadcast over a large region. The waves are sensed by antennas connected to television receivers. The range of waves suitable for radio and television transmission is divided into channels, which are assigned to broadcast companies or services. In the United States the Federal Communications Commission (FCC) has assigned 12 television channels between 54 and

216 MHz in the very-high-frequency (VHF) range and 56 channels between 470 and 806 MHz in the ultra-high-frequency (UHF) range (see radio frequency).

Most television viewers in the United States no longer receive signals by using antennas; instead, they receive programming via cable television. Cable delivery of television started as a way to improve reception. A single, well-placed community antenna received the broadcast signals and distributed them over coaxial or fiber-optic cables to areas that otherwise would not be able to receive them. Today, cable television is popular because of the wide variety of programming it can deliver. Many systems now provide more than 100 channels of programming. Typically, a cable television company receives signals relayed from a communications satellite and sends those signals to its subscribers. The first transatlantic television broadcast was accomplished by such a satellite, called Telstar, on July 10, 1962. Some television viewers use small satellite dishes to receive signals directly from satellites. Most satellite-delivered signals are scrambled and require a special decoder to receive them clearly.

The wide availability of television has raised concerns about the amount of time children spend watching TV, as well as the increasingly violent and graphic sexual content of TV programming. Starting in 1999 the FCC required TV set manufacturers to install V-Chip technology that allows parents to block the viewing of specific programs; that same year the television industry adopted a voluntary ratings system to indicate the content of each program.

Various interactive television systems have been tested or proposed. An interactive system could be used for instant public-opinion polls or for home shopping. Many cable television systems use an interactive system for instant ordering of pay-per-view programming. Others systems poll their subscribers' equipment to compile information on program preferences. Several competing commercial systems have connected televisions to the Internet.

STORY:

(Reuters) - At least three flat-screen technologies are vying to replace the boxy television set as TV makers accelerate their biggest design change since they replaced black-and-white with color. With screens just a few inches thick and often measuring 40 inches or more diagonally, TVs using plasma or liquid crystal display (LCD) technologies are one of the most desirable products to reach electronics showrooms in years. Priced in thousands of dollars, however, a television you can hang on the wall remains a dream for most consumers, and flat screens have grabbed only three percent of a global TV market estimated at \$31 billion.

Display makers are confident sales will double each year for the next couple of years as consumers switch from traditional cathode ray tube technology. What is less certain is whether the dominant technology will be plasma, the current choice for large screens, or LCDs, which monopolize the smaller screen market but are getting bigger and cheaper. There is also a wild card in an emerging technology called organic light-emitting diodes, also known as "glowing plastics."

LCDs have been difficult to make in the larger sizes used in their plasma rivals, so plasma dominates the bigger end of the market. But overall, LCD outsells plasma two to one worldwide, thanks to demand for small screens for cramped homes in Japan.

For a 32-inch screen, there is little difference in price between the technologies: both can be bought for under \$3,000 over the Internet in the United States. But while the price for a 42-inch plasma TV is only a little more, the same size LCD costs around \$6,000.

However, plans by South Korean and Taiwanese companies to invest \$25 billion in LCD production could lower costs dramatically. The companies, which produce nearly 70 percent of the world's LCD panels, expect to bring their larger screen price down to around \$2,000 in 2006, helping to lure more customers.

Neither flat screen technology is perfect. LCDs last longer and consume less power than plasmas but are not as bright. Screens can also appear faded when viewed at an angle. Plasma panels, which generate pictures using gases trapped between two sheets of glass, have a wide viewing angle but can require noisy fans to keep them cool.

Could there be an alternative? Some in the industry are betting on paper-thin, foldable screens that use organic light-emitting diodes, or OLEDs. Companies such as Seiko Epson, Philips, DuPont Co and Siemens-owned Osram are developing the technology, which does not require the backlight needed in LCD panels, making them more energy efficient and much thinner. But researchers face a serious challenge in stretching the life of the light-emitting materials so they last long enough for a TV, and analysts say OLEDs are unlikely to be ready for use in screens for several years.

And don't write off the cathode ray tube just yet. Although DVDs played back on the top plasma screens produce stunning pictures, some experts feel they are still not a match for the best traditional TVs.

NOTE: Most people do not realize that early US TVs had Channel One. Prewar electronic television sets had 3 or 5 channel tuners, which included Channel 1. The FCC (Federal Communications Commission) reorganized the frequencies (several times) in the 1940s, and finally 'killed Ch-1' in 1946 by reassigning the Ch-1 frequency for non-TV use.

Postwar television sets built through 1947 had 13-channel tuners (starting with Channel One and ending with Channel 13). The year 1948 was a mixture of 12 and 13 channel sets, and a few manufacturers even continued to sell 13 channel sets into 1949, as old inventory was being depleted.

After 1949, all VHF TV-set tuners were 12-channel. They started with Channel 2 and ended with Channel 13. By dropping Channel 1 from the tuner selector and starting at Channel 2, the remaining frequencies were unchanged, and

TV sets did not become obsolete or require modifications.

CONCLUSION:

Of all the major inventions of the twentieth century, few have had a more profound impact on people's lives than radio and television. By 1933, two-thirds of American homes had at least one radio, twice as many as those with telephones. Forty-five years later, 97 percent of all households had at least one television set. But the numbers cannot convey the contradictory roles that broadcasting has played in American society as it has reshaped the country's politics, economy, and culture.

The broadcast media have allowed Americans to listen to and watch candidates for public office in order to decide for themselves who merits their support. But television has also trivialized politics, overemphasizing appearance and style while too often serving as gatekeeper for the flow of information about the political process. Radio and television have exposed Americans to an unprecedented amount of news and information. But they have also promoted anti-intellectualism and elevated mindless entertainment over the pursuit of knowledge. Broadcasting provides free entertainment in the home, which is often a godsend for the ill, the confined, parents of small children, and those simply exhausted after a day's work. But in exchange, the audience has become a commodity sold to advertisers, who in turn try to persuade everyone, including children, to buy their products. Radio and television, then, have both expanded and narrowed people's horizons. But as we review their enormous impact on American life, we should keep in mind that they are not a sort of hypodermic needle, injecting an unsuspecting culture with alien messages. They are the product of American history, having themselves been shaped by the trends and events of the twentieth century.

THIS WEEK IN HISTORY:

September 8, 1974

Ford Pardons Nixon

In a controversial executive action, President Gerald Ford pardons his disgraced predecessor Richard Nixon for any crimes he may have committed or participated in while in office. Ford later defended this action before the House Judiciary Committee, explaining that he wanted to end the national divisions created by the Watergate scandal.

The Watergate scandal erupted after it was revealed that Nixon and his aides had engaged in illegal activities during his reelection campaign--and then attempted to cover up evidence of wrongdoing. With impeachment proceedings underway against him in Congress, Nixon bowed to public pressure and became the first American president to resign. At noon on August 9, Nixon officially ended his term, departing with his family in a helicopter from the White House lawn. Minutes later, Vice President Gerald R. Ford was sworn in as the 38th president of the United States in the East Room of the White House. After taking the oath of office, President Ford spoke to the nation in a television address, declaring, "My fellow Americans, our long national nightmare is over."

Ford, the first president who came to the office through appointment rather than election, had replaced Spiro Agnew as vice president only eight months before. In a political scandal independent of the Nixon administration's wrongdoings in the Watergate affair, Agnew had been forced to resign in disgrace after he was charged with income tax evasion and political corruption. Exactly one month after Nixon announced his resignation, Ford issued the former president a "full, free and absolute" pardon for any crimes he committed while in office. The pardon was widely condemned at the time.

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ENTERTAINMENT:**TV's New 'Whoopi'**

Grammy Winner. Emmy Winner. Oscar Winner. Oscar Hostess. And now headliner of her own NBC comedy. Whoopi Goldberg stars as Mavis Rae, a proud, opinionated lady who owns and runs her own small, downtown New York hotel.

Keeping things lively around the place are Mavis' older brother Courtney, Iranian handy man Nasim and Courtney's girlfriend Rita.

(Reuters) - So far, NBC hasn't blinked. In fact, says the Oscar-winning actress, executives at the General Electric-owned television network think she could even be "a little riskier."

That also goes for some of the more unsavory aspects of the character she plays on "Whoopi" -- Mavis Raye, a tart-tongued, menopausal former singer turned hotelier in New York City who smokes like a chimney and drinks on the job. The series pilot opens with a cigarette joke. A hotel guest admonishes Goldberg that "second-hand smoke kills," to which she retorts, "So do I, baby, walk on!" Goldberg's on-screen puffing already has drawn the ire of anti-tobacco activists.

"Whoopi," which begins on Tuesday, marks Goldberg's first stab at her own prime-time series since the short-lived 1990 CBS sitcom "Bagdad Cafe," in which she played the proprietor of a diner-motel in the California desert. She also was a regular for five years on "Star Trek: The Next Generation."

An Oscar winner for her turn as a spiritual medium in the 1990 film "Ghost," Goldberg, 47, said her return to the small screen comes at an ideal time. "I'm a little bit older now, and I like the idea of being in a steady gig," said the actress, who acts as executive producer as well as the star of "Whoopi." "There's not a lot of offers coming my way, either. You get into that awkward stage of late 40s, and things slow down."

SPORTS:

Roddick Wins Open

AP - With 23 aces, strong baseline play and a veteran's composure, Andy Roddick beat Juan Carlos Ferrero 6-3, 7-6 (2), 6-3 Sunday to win the U.S. Open final and his first Grand Slam — a breakthrough that very well could be followed by a series of major triumphs.

"I can't imagine my name and 'U.S. Open champion' together. It's more than I could ever dream of," Roddick said. "I came to this tournament so many times as a little kid and watched from way up there." He's still a kid, of course, just 21. And the newly No. 1-ranked Ferrero is 23, making for the youngest combined ages of U.S. Open finalists since Sampras beat Andre Agassi in 1990.

After Roddick's final too-fast-to-see serve — his 123rd ace of the tournament — he curled into a ball, covering his eyes as they welled with tears. Then he waded through the courtside photographers' pit and climbed into the stands for a frenzied series of hugs with his singer-actress girlfriend, Mandy Moore, his parents, his brothers and a couple of friends who drove 10 hours to cheer on their buddy.

The Open began two weeks ago with a retirement ceremony for Sampras, who beat Roddick in the quarterfinals last year en route to his record 14th Grand Slam title.

BIOGRAPHY:

ALBERT EINSTEIN

Albert Einstein was born at Ulm, in Württemberg, Germany, on March 14, 1879. In 1896 he entered the Swiss Federal Polytechnic School in Zurich to be trained as a teacher in physics and mathematics. In 1901, the year he gained his diploma, he acquired Swiss citizenship and, as he was unable to find a teaching post, he accepted a position as technical assistant in the

Swiss Patent Office. In 1905 he obtained his doctor's degree.

During his stay at the Patent Office, and in his spare time, he produced much of his remarkable work and in 1908 he was appointed Privatdozent in Berne. In 1909 he became Professor Extraordinary at Zurich, in 1911 Professor of Theoretical Physics at Prague, returning to Zurich in the following year to fill a similar post. He became a German citizen in 1914 and remained in Berlin until 1933 when he renounced his citizenship for political reasons and emigrated to America to take the position of Professor of Theoretical Physics at Princeton. He became a United States citizen in 1940 and retired from his post in 1945. After WW II, Einstein was a leading figure in the World Government Movement, he was offered the Presidency of the State of Israel, which he declined.

At the start of his scientific work, Einstein realized the inadequacies of Newtonian mechanics and his special theory of relativity stemmed from an attempt to reconcile the laws of mechanics with the laws of the electromagnetic field. Einstein guessed that the correct interpretation of the special theory of relativity must also furnish a theory of gravitation. During this time he also contributed to the problems of the theory of radiation and statistical mechanics.

In the 1920's, Einstein embarked on the construction of unified field theories, although he continued to work on the probabilistic interpretation of quantum theory, and he continued with this work in America.

He married Mileva Maritsch in 1901 and they had two sons; their marriage was dissolved and in 1917 he married his cousin, Elsa Einstein, who died in 1936. He died on April 18, 1955 at Princeton, New Jersey.



FEATURE:

Civil War:

Part III

It was also almost impossible to make the North's blockade of Southern ports completely effective because the South's coastline stretched 5600 km (3500 mi) and contained nearly 200 harbors and mouths of navigable rivers. The Appalachian Mountains also hindered rapid movement of Northern forces between the eastern and western areas of the Confederacy while the Shenandoah Valley of Virginia offered a protected route through which Confederate armies could invade the North. The placement of Southern rivers, however, favored the North. The Mississippi, Tennessee, and Cumberland rivers provided excellent north-south avenues of advance for Union armies west of the Appalachians. In Virginia, Confederates defended from behind the state's principal rivers, but the James River also served as a secure line of communications and supply for Union offensives against Richmond in 1862 and again in 1864.

TECHNOLOGY: Technological advances helped both sides deal with the great distances over which the armies fought. The Civil War was the first large conflict that featured railroads and the telegraph. Railroads rapidly moved hundreds of thousands of soldiers and vast quantities of supplies; the North contained almost twice as many miles of railroad lines as the South. Telegraphic communication permitted both governments to coordinate military movements on sprawling geographical fronts.

The combatants also took advantage of numerous other recent advances in military technology. The most important was the rifle musket carried by most of the infantrymen on both sides. Prior to the Civil War, infantry generally had been armed with smoothbore muskets, weapons without rifling in the barrels. These muskets had an effective range of less than 90 m

(300 ft). As a result, massed attacks had a good chance of success because one side could launch an assault and not take serious casualties until they were almost on top of the defenders. The rifle musket, with an effective range of 225 to 275 m (750 to 900 ft), allowed defenders to break up attacks long before they reached the defenders' positions. Combined with field fortifications, which were widely used during the war, the rifle musket changed military tactics by making charges against defensive positions more difficult. It also gave a significant advantage to the defending force.

Other new technologies included ironclad warships, which were used by both sides; the deployment of manned balloons for aerial reconnaissance on battlefields, used mainly by the North; the first sinking of a warship by the South's submarine, known as the *CSS Hunley*; and the arming of significant numbers of soldiers with repeating weapons, carried mainly by the northern cavalry. The technology for all of these weapons had been present before the Civil War, but never before had armies applied the technology so widely.

MANPOWER AND FINANCE: At the beginning of the war, state militias provided most of the troops for both Union and Confederate armies. Soon large numbers of civilians were volunteering for military service. Throughout the war, the bulk of the forces consisted of volunteers. When the number of volunteers lagged behind the growing battle casualties, both the Northern and Southern governments resorted to drafting men into the armies.

The Confederacy passed the first draft act in April 1862. The Union followed almost a year later. In both North and South, men of certain classes, occupations, and professions were exempted from the draft. Furthermore, a man who was drafted in the North could avoid military service by making a money payment to the government and in both the North and South, a draftee could hire a substitute to go to war for him.

Stay Tuned...

Quote of the Week:

I don't have any problems with and will continue to have as much fun with our president as every comic has since comedy began." *-Whoopi Goldberg*

Word of the Week: Steadfast

Fact of the Week:

The first use of "canned laughter" or the Laugh Track was in 1950 on NBC's 'The Hank McCune Show'.

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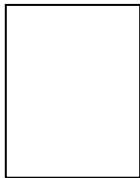
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