

Comeback for Ampex

In the bull market of the late 1950s, one of the rampaging stocks was Ampex Corp., a Redwood City, Calif., company that manufactures recording equipment ranging from videotape for television stations to magnetic memory tape for high speed computers. From 75¢ a share in 1954, Ampex stock shot up to 45¹/₂ in 1959 after two stock splits. Then, in 1960, Ampex suddenly lost its magic. Its one-time profits turned to a \$3,930,000 loss, and its stock plummeted.

Today, Ampex is well on the road to recovery. This year the company expects to earn \$3,500,000 on sales of \$92 million, and its stock has risen from a 1962 low of \$10 to \$16.75 last week. But to accomplish its comeback Ampex has gone through a painful purge.

Without a Plan. Ampex got into trouble by growing almost without effort—and without planning. In 1955 Ampex Founder Alexander M. Poniatoff,* a brilliant engineer with scant taste for administration, stepped up to chairman and turned over operational control of the company to ex-Banker George I. Long Jr., 55. Faced with a constant proliferation of products, Long tried to meet the situation by decentralizing Ampex into five divisions, each so loosely controlled that it amounted almost to an independent company. This added millions to overhead—millions Ampex could no longer afford when the 1960-61 recession began to cut into sales.

To solve its problems, Ampex called in a management consultant firm which in turn called in personable William E. Roberts, 38, a crack administrator who had just lost out in an executive suite battle for the presidency of Chicago's Bell & Howell Co. Roberts, who passed up 15 other job offers to take on the presidency of Ampex, proceeded to cut administrative costs by \$4,600,000 in a single year. He recentralized financial control in Redwood City, hired one ad agency to replace five, and consolidated Ampex's diffused marketing operations ("We had as many as four offices in a single city"). More remarkable, he eased out all but one of Long's half-dozen top subordinates without engendering any visible bitterness.

Time for Normality. Roberts freely admits that he owes a big debt to Long, who stoutly refused, even after Ampex came upon hard times, to make any major cuts in the company's research budget. Says Roberts: "The previous management could have made itself look reasonably good by eliminating several million dollars worth of research and development, but it would have set us back five years." Thanks to Long's stand, Ampex is still churning out new products, two weeks ago introduced a portable videotape recorder that sells for \$12,000 v. \$35,000 to \$60,000 for most other videotape recorders.

To accomplish Ampex's turnaround, Bill Roberts has had to neglect his low-90s golf game and better-than-average tennis, and sacrifice virtually all semblance of family life. But now, says he, "it's nearing the point where I'm beginning to be satisfied and lead a normal life. Today, we're running this company with predetermined objectives, not just taking a product and carrying it one little step further."

* Who combined his initials with "ex" (for "excellence") to form the company's name.

Replaying for Profit

One of the busiest TV performers during the strike against the networks has been the Ampex Corp. of Redwood City, Calif. As the supplier of 75% of the complex electronic equipment used in television production, Ampex accounts for most of the video tape recorders that are now working overtime, unreeling reruns while live stars man the picket lines.

When the need for reruns runs out, Ampex may be busier than ever. At the National Association of Broadcasters convention in Chicago last week, Ampex engineers showed off new gear that promises to greatly expand the versatility of television. Most impressive of the items is a \$65,000 combination camera and videotape recorder (VTR) that will enable a single roving newsman to record news events on tape for immediate broadcast. The 50-lb., battery-powered pack can tape up to 20 minutes of black-and-white action on a single reel, does away with the gear-laden truck and crew now required for mobile videotape coverage.

Ampex also demonstrated a new \$110,000 VTR that should have particular appeal to TV sports buffs. By recording on large metal disks rather than reels of magnetic tape, the machine will permit the first "instant replays" in color. As if that were not enough, it will allow action to be run forward and in reverse in both fast and slow motion.

For the rapidly expanding market in closed-circuit videotape for educational and industry-training programs, Ampex also introduced a color VTR that at \$4,495 is the first ever to be available under \$50,000.

Snickering Critics. No one gets more satisfaction from the new products than Ampex President William E. Roberts, 52. Once the No. 2 man at Bell & Howell, Roberts joined Ampex in 1961 after the loosely managed company had tumbled deep into the red. Many of Roberts' remedies were routine: he centralized administrative control, for example, and lopped off unprofitable product lines. Yet, despite Ampex' shortage of cash, Roberts also ordered a lavish step-up in research and development spending. R. & D. engineers and scientists were set to work on so many new projects that snickering critics took to calling Ampex "the model shop."

Ignoring the snickers, Roberts insisted on "an adequate yield for each dollar spent" on R. & D.—and got more than anyone expected. In five years, the returns have soared from 1961's \$3,900,000 deficit to \$8,510,000 profit. Sales have more than doubled, to \$169 million in fiscal 1966; they are running 32% better than that for fiscal 1967, which ends April 30.

"Instant Re-Fry." For the future, Ampex looks for most of its growth to come from new and cheaper videotape equipment. Ampex competes with G.E. and Japan's Sony and Panasonic in the burgeoning closed-circuit VTR market, which is expected to quadruple to \$400 million in five years. Ampex now controls some 75% of the market with \$1,195 to \$8,000 VTRs that are used for everything from training Burger Chef cooks in a course called "Instant Re-Fry" to giving Navy carrier pilots a flight-deck view of their own landing techniques minutes after touchdown. As far as the model shop is concerned, the next big project is to produce a low-price camera-recorder-TV receiver combination that Ampex says may be "the most promising home-entertainment innovation since television itself." Sony introduced a \$1,345 set in 1965; Ampex, General Electric and Panasonic sets go for \$1,600. Next year Roberts plans to be first with a version "priced in the range well under \$1,000."

Tangle in Tapes

A company that grabs early sales leadership for a highly popular new product usually finds that the battle has only begun. The harder part of the fight is to stay on top after competitors swarm into the market, as they almost inevitably do. This lesson is hitting home at Ampex Corp., which helped make stereo tape recordings one of the outstanding sales successes of the late 1960s.

Ampex, based in Redwood City, Calif., first won supremacy in the market by the ancient strategy of being first with the most. When stereo tape cartridges and portable players appeared in 1965, most recording companies were reluctant to make the large investment needed to produce tapes for cartridges. Ampex officials correctly figured that consumers, particularly among the young, would spend heavily for the opportunity to listen to 80 minutes or so of uninterrupted stereo music of their choice in cars, on the beach, or anywhere that they might travel. The company contracted to reproduce on tape the music of scores of recording companies and began mass marketing.

Ampex quickly won the largest share—as much as 40%—of a market that last year had estimated retail sales of \$400 million. Tapes account for 25% of the sales of the entire recorded-music business, up from 3% or 4% in 1966. Though the sound of new disk records is generally thought to be better, the quality of tapes tends to last much longer because they use no needles. The recorded tapes have become the fastest-growing segment of Ampex's domestic business. In eight years under President William Roberts, the company's sales have climbed from \$84 million to \$296 million and its profits from \$3.8 million to \$13.7 million.

Mod Counterattack. Now Ampex is paying the price of success. Its example has stimulated some of its music suppliers to become competitors, drop their contracts with Ampex, and begin making tapes themselves. Their activity adds to already vigorous competition from

RCA, Columbia, Capitol and such relatively new companies as General Recorded Tape and International Tape Cartridge. Ampex officials concede that their market share has recently dropped to about 35%—some rivals put it closer to 30%—and is likely to shrink further, perhaps to 25%. Though they think that such a share would be enough to keep sales rising because of anticipated market growth, they are not complacent about the prospect.

The Ampex counterattack is led by Donald V. Hall, 33, vice president of the Chicago-based tape division. He is a mod executive who favors Edwardian suits and splashy ties, partly, he says, as an example to older Ampex executives, whom he is trying to persuade to think "pop." He also has come to admire the music that the young favor, and that helps him in negotiating with some recording stars. "These kids on records are saying something," he explains. "If you are an adult, and you shut them off, then you are not hearing what's going on."

Bagging a Speckled Bird. Hall has signed up some 36 independent record producers to replace the companies that have dropped Ampex contracts. More important, Ampex has established its own record-making division, partly to assure itself of a future supply of music. It has recruited The Great Speckled Bird, The American Dream and other singing groups to perform on tape.

Even if these efforts fail to stop Ampex's market from winding down, the company has many other prospects for growth. It also makes equipment for radio and TV stations, satellite-tracking stations and computer systems, and produces information-retrieval systems. Ampex has an impressive record of seeing and exploiting the potential of the new technologies. Every year since 1962, two-thirds of its sales have come from products less than five years old.

As president of California's Ampex Corp., William E. Roberts, 49, has talked softly but swung a sharp ax. Called in three years ago to reshape the overexpanded manufacturer of recording equipment, he slashed away at excess executives and profitless products, pulled together Ampex's loose divisions under his own strong central control. Last week, having brought the company back from a \$3,900,000 loss in 1960 to a \$5,000,000 profit in 1963, Bill Roberts felt strong enough to expand: in a stock swap, Ampex took over Mandrel Industries Inc., a maker of complicated equipment for finding oil, which grossed \$21 million last year. No scientist himself, Roberts was forced by the Depression to leave Illinois' Lake Forest College, made his way up to executive vice-president at Bell & Howell before joining Ampex. Though he is a business generalist, he has high regard for specialists. Even in Ampex's lean years, he expanded its technical staff, saw the investment pay off when the company turned out 24 new products last year.

A WORD of advice from his father, who was editor of the Minneapolis Tribune, convinced Thomas Church Dillon to give up his boyhood ambition of becoming a newspaperman. Said Dad: "When a publisher decides to economize, he looks at his reporters as the guys who spend the money, and at his advertising men as the guys who make the money. Now, who do you think he fires?" Dillon became an ad man. Leaving Harvard in 1936 without graduating, he joined Batten, Barton, Durstine & Osborn, now the world's fourth largest agency (1963 billings: \$248 million). Last week, at 48, Dillon became B.B.D.O.'s president and heir apparent to Chairman Charles Brower, 62. Like the more flamboyant Brower, Dillon is a copywriter, has concocted such forgettable slogans as the Northern Pacific Railway's "Main Street of the Northwest" and "Standard [Oil] takes better care of your car." Advertising can be automated, Dillon believes; B.B.D.O. will soon launch a system that—by feeding complicated market-testing results into a computer—is hopefully expected to lower the 90% failure rate of new products.

New Note in Music

The home tape recorder, up to now a gadget used chiefly by hobbyists and high-fidelity fans, is becoming a full-fledged challenger of the record business. RCA Victor has just put on sale its first reels of music on tape. The 17 tape recordings range from Brahms to Gershwin, play about as long as a 12-in. LP record, and sell for \$11 to \$15 (v. \$4 to \$6 for comparable disk records).

RCA is following the lead of Webster-Chicago and smaller companies, which have already brought out music on tape.

Capitol and Decca are also getting set to sell music on tape, and Muzak is busily converting all its disks to tape. Columbia is going into production of its first tape recorder and Bell Sound Systems is bringing out a popular-priced (\$29.95) tape playback to plug into phonograph systems. The demand for tape has grown so fast that the biggest U.S. producer, Minnesota Mining & Manufacturing Co., announced last week that it has doubled production facilities in the last six months.

Sales of tape recorders and tape are expected to reach \$120.6 million this year, up from \$74.7 million last year.

Mass Production. This boom in prerecorded tape was made possible by Redwood City, Calif.'s Ampex Corp., which makes duplicating machines for RCA, Victor, Webster-Chicago and others. Now Ampex has perfected a new machine that will make 320 tape recordings in the time it formerly took to make one. Originally, tapes had to be duplicated a few at a time and at playing speed, making them too expensive for most home-music fans.

The growth of Ampex is a prime example of the growth of the tape-recorder business. Ampex was founded in 1944 by Alexander M. Poniatoff, 62, who was born in Kazan, Russia, trained in Germany to be an engineer, and came to the U.S. in 1927, where he got a job with General Electric. During World War II, he started Ampex to make electronic equipment for the Navy, began building tape recorders at war's end.

Now Ampex is supplying automatic recording equipment for radio stations and the Government's guided-missile program. Ampex has helped develop other uses for tape, e.g., industrial music for factories, teaching school, recording TV images, sound for movies and earthquakes. For all these activities, Ampex now has more than 550 employees, and expects to gross \$6,500,000 this year.

Higher-Fi. In company with its competitors, Ampex is also bringing down the cost of home recorders, has put out a \$545 model this year. Magnecord, another top-quality builder of recorders, is bringing out a new low-cost model at \$300.

No one expects pre-recorded tape soon to take the place of all disk recordings. It is not practical for short, popular tunes. But for classical music, tape has unbeatable advantages over a disk: it can record sound more faithfully, does not wear out, has no needle scratch.

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Business

GOODS & SERVICES

Robot Announcer. California's radio station KEAR at San Mateo plans to go on the air this week without an announcer from 6 p.m. to midnight. Instead, KEAR will use a new long-playing tape playback device developed by Ampex Electric Corp. of Redwood City, Calif. Spot announcements and commercials are recorded on one tape, music on another; the announcements are cut in automatically, thus permitting KEAR to operate with only an engineer on duty. Cost of two tape and recording units: approximately \$1,140.

Figures in a Flash

To cope with the staggering information explosion in both business and government, a whole new electronic technology is fast developing that can store, catalogue and recall facts and figures in a pushbutton flash. Among the more sophisticated "information-retrieval" systems, Stromberg-Carlson has produced its 4020, Eastman Kodak its Recordak Miracode, RCA its 3488 and IBM its Walnut, which is used by the Central Intelligence Agency. Last week California's Ampex Corp. introduced the latest retrieval machine, a completely automated microfilming system that allows the searcher to edit his material as he selects it.

Ampex's Videofile system condenses bulky file folders to tiny reels of television magnetic tape, enabling 250,000 document pages to be stored on a 14-in. reel. At the push of a button, from any number of locations and at great distances, Videofile's computer automatically locates the individual file-on-film, then reproduces it as pictures on a TV screen or as printed copies—all in less than a minute. The operator can scan the TV screening of the file, get printed copies of only what portions he needs. More important, says Ampex, individual file entries can for the first time be replaced, relocated or deleted without replacing the entire section of the file. Cost: \$200,000 to \$1,000,000, depending on the size of the filing operation needed.

Videofile will be the component for other systems that Ampex intends to design specifically for banks, hospitals, insurance firms and other industries. The market for such retrieval systems is \$23 million this year, but Ampex expects it to grow to \$1.5 billion within the next decade. As the nation's paper work piles up, the machines are bound to become even more sophisticated. IBM's 7770 system not only taps millions of business facts stored in a computer but talks back to the information seeker with a 126-word vocabulary. Its recorded voice is sometimes that of a woman, but it is all business.

Taping Untapped Markets

Few Americans have ever seen one, but the videotape recorder is playing a steadily bigger part in their lives. It is a device that records and stores images and sounds on magnetic tape and plays them back immediately—or hours or years later. About a third of the shows on TV are so recorded. American Airlines and Pan American use videotape for their in-flight entertainment. The New York Telephone Co. helps train its salesmen by videotaping them during practice sessions and showing them playbacks of their mistakes. Yonkers Raceway uses the videotape to judge photo finishes. Many schools have begun to use videotape for classroom teaching, and several manufacturers use recordings of complex industrial processes to track down production problems.

Simplified Recorder. Although videotape recorders were first marketed in 1957, their high prices—ranging from \$10,000 to \$100,000—long limited their sales. But prices are starting to come down, and sales are going up. Manufacturers of videotape recorders reached \$40 million in sales last year; the industry now stands on the verge of a vast expansion. Sales are expected to rise to \$200 million within five years, and several new companies are entering the field. Last week California's Ampex Corp., which pioneered videotape recordings and still controls about two-thirds of the market, introduced a new simplified recorder that will sell for \$3,950, less than half the cost of other models now available.

The greatest market potential for videotape recorders—the U.S. home—is still untapped. Inexpensive portable video outfits could take much of the fuss out of making home movies. Unlike film, videotape does not have to be sent out for developing or threaded into a projector, can be erased and used repeatedly without deterioration. It can be played back immediately from the videotape recorder onto the nearest TV screen. Videotape recorders can be adjusted to turn on TV sets and record favorite programs while people are away from home, enabling them to play back the programs later. Eventually, videotaped news and sports events, plays and educational shows could be sold or rented for replay on home TV sets.

Such possibilities are spurring the trend to simpler and less expensive recorders. Fairchild Camera & Instrument Corp. is developing a home videotape recorder that it hopes to market for \$500. Sony, which already sells expensive recorders to TV stations and airlines, plans to introduce a set in the U.S. this spring that will sell for about \$1,000. Both Ampex and RCA are working on home recorders of their own.

Complex Experiment. The new Ampex model, while still too expensive for most families, should bring videotape recorders within the price range of most of the nation's 30,000 school districts, the second biggest potential market. In the classroom, teachers can use videotape to record important telecasts—such as Churchill's funeral or a papal coronation—and then play them back during school hours on classroom TV screens. With auxiliary cameras, some schools are already taping complex laboratory experiments, demonstrations and lectures by talented teachers, then showing them over and over again in the classroom.

Tape from Opelika

In the wonder world of electronics, much of the magic is performed by a simple looking device—a plastic ribbon covered with particles of iron oxide. Its name: magnetic tape. On its surface a fantastic amount of sights, sounds and statistical data can be electromagnetically recorded. The tape can be played over and over again without wearing out, can be erased and used again for new recordings. Tape recorders are challenging phonographs for hi-fi music; they fly in jet planes and guided missiles to record test data; in the first earth satellite, a tape recorder will read dozens of instruments and transmit the data to earth. Using magnetic tape, giant computers compile payrolls and forecast sales. Entire libraries and millions of legal documents are being tape-recorded. This fall CBS and NBC will replace their kinescopes with tape recorders to rebroadcast TV programs so that they can be shown at the same hour across the U.S. with all the clarity of the live broadcast.

Last week, as other stocks drowsed, Wall Street woke up to the wonders—and possibilities—of magnetic tape. The stock of ORRadio Industries Inc. jumped live points in a day to 23. Reason: ORRadio, one of the four major makers of magnetic tape (others: Minnesota Mining & Manufacturing Co., Audio Devices Inc., Reeves Soundcraft Corp.), is the fastest growing company in the new field. Its sales, which rose 62% to \$1,600,000 last year, are expected to hit \$2,500,000 this year and quadruple next year. This week in Opelika, Ala., ORRadio rushed to completion part of a new plant to start commercial production of tapes used to rebroadcast TV programs.

Hitler v. Ike. ORRadio's founder—and a pioneer in U.S. tapemaking—is John Herbert Orr, 46, onetime radio-station owner. While serving as a major and chief radio engineer on General Eisenhower's SHAEF staff during World War II, Orr, like other radio experts, was amazed at the lifelike quality of Nazi broadcasts of Hitler's speeches. They had none of the distortions of speeches rebroadcast from the wire recorders then used by the U.S.

When the Allies captured Radio Luxembourg, Orr found out the secret: the Germans were using a "Magnetophon" recorder with a magnetic tape far superior to familiar paper tapes or wire. The recording of a speech by Hitler was erased from a captured tape and a speech of Ike's recorded on the same tape for rebroadcasting. But the erasure was muffed and, in the middle of Ike's talk, Hitler's voice broke in loudly. Orders quickly came to manufacture some new tape. Orr tracked down Dr. Fritz Pflaumer, who had developed the original magnetic tape for the I.G. Farben chemical combine, got the basic know-how necessary to produce the new tape. Pflaumer also gave him a formula for a much better tape.

Unlimited Market. Back in Opelika after war's end, Orr set up shop with six employees to make the improved tape. He invested \$250,000 realized from the sale of Opelika's radio station WJHO and other holdings, sold stock to friends by incorporating in 1950, raised another \$246,675 in 1953 by a public offering of 149,500 shares of stock. After licking production problems, he developed a new tape coating (Ferro-Sheen) with unusually high fidelity. This caught the eye of the Ampex Corp., a maker of wire recorders and other electronic equipment, which had gone into the manufacture of tape recorders after one of its engineers had brought two of the Magnetophons back from Germany. ORRadio and Ampex worked together to develop the TV tape for rebroadcasting. Ampex was so delighted with Orr's new tape that it later bought a 28% interest in his company, supplied Orr with another \$250,000 for expansion.

Next month Orr will announce another new tape, especially designed for long-life storage of valuable documents. The tape will last for up to 100 years, cannot be erased, thus eliminating one of the drawbacks of present tape, which can easily be accidentally erased. Orr sees unlimited uses for tape, not only for computers and automatic machines but for all manner of consumer products. Like other tapemakers, he sees tape

recordings superseding phonograph records as soon as the cost can be cut. Before long, he expects, people will take home movies with electronic cameras employing magnetic tapes, run them off through their TV sets. Says he: "Our sales will be limited only by our capacity to produce."

Getting It Taped

President Eisenhower took his inaugural oath last week twice within half an hour—or so it looked to millions of viewers on CBS and NBC. The trick was done not by mirrors but their electronic equivalent: the new Videotape Recorder, a 900-lb. machine that captures images as well as sound on magnetic tape and can play them back instantly—or when ever the user wants them—with fidelity approaching the original picture. It was the first time that TV had used Videotape in covering the news, but its experimental use in the few weeks since the networks got the machines from California's Ampex Corporation* has persuaded broadcasters that it is the peephole to a whole new televista.

Ampex's first big job will be to carry taped versions of live New York network shows to Western time zones so they can appear everywhere at the same hour. The tape pictures will be easier and cheaper to produce than the fuzzy, hastily developed Kinescopes now used for the purpose. The tape needs no processing, can be erased and re-used up to 100 times.

First to order the machines, CBS pioneered last month in taping its Douglas Edwards news program for replay on the West Coast. Last week, after the inaugural, NBC began taping Today, Home and Tonight for the West. Both networks have also begun using tape to record complete shows in advance—NBC with Truth or Consequences, and CBS with one or two hours of the Arthur Godfrey Show so that fans will not languish entirely without the real Arthur while he goes on a five-week vacation to Africa. Among its advantages, the tape does away with waiting for "rushes" to see if retakes are necessary: immediate playback ensures prompt correction of errors.

However, tape will lag somewhat in replacing film for much TV production because, so far at least, it cannot be edited as flexibly. Also, its dramatic possibilities for swift visual news coverage will not be fully realized until lighter, more mobile machines can be built to accompany newsmen. Closer at hand is the prospect of great savings in heavy overtime pay now shelled out by broadcasters for night and weekend operations. Tape should enable them to shoot most of their broadcasting schedule in normal weekday working hours. Across the U.S., independent stations as well as the networks have given Ampex orders for no of the recorders at \$45,000 each.

Riding the Reels

When the technique of tape recording was developed a quarter-century ago, it unreeled a whole new way of marketing recorded music. The best tapes had all the high fidelity of phonograph disks but none of their low resistance to wear and tear. The trouble was that they were cumbersome: wound on one reel, they had to be threaded through the playback machine onto another reel, then rewound. In the process, the hapless user could find himself struggling like Laocoon within coils of tape. Before taped music could begin to have the mass appeal of disks, something was needed to simplify the handling.

Simplicity came three years ago with the introduction of the tape cartridge. The cartridge is a plastic case somewhat smaller than a paperback book. It contains a continuous loop of tape that automatically starts rolling when the cartridge is inserted in a slot on the playback machine; thus the user never touches the tape itself.

One of the secrets of the cartridge's miniaturization is that its tape moves more slowly over the sound pickups than conventional reel-to-reel tape. Since sound quality is related to tape speed, the cartridge sacrifices some high fidelity—but in return it crams in an average of 80 minutes of uninterrupted music. Its biggest market so far has been in autos; since 1966, Detroit manufacturers have offered dashboard-model cartridge players as optional equipment on new models.

Lilliputian Variant. Now, in the newest twist in tapes, a variant on the cartridge has come along that is even more convenient and Lilliputian than the original. Called a cassette, it encases a tape and two tiny reels within a plastic box scarcely bigger than a pack of cigarettes. It snaps into a player as handily as the cartridge does, but it must be removed and turned over at the midpoint of its playing time, which averages 40 minutes. Since it moves even more slowly than the cartridge, it sacrifices still more sound quality. But it boasts two big advantages. Unlike most cartridges, it can be wound forward or backward for playback of selected portions of the tape. And a blank cassette can be used in most players to record directly from radio, TV, disks—or a concert stage.

Actually, cassette recorders have been in use for several years as dictating tools for executives, actors, doctors and language instructors. Today they are widely used in the music world as well. Conductor Herbert von Karajan saved rehearsal time for last year's Salzburg Festival production of *Die Walküre* by having the singers study cassettes made from his earlier recording of the opera. Mezzo-Soprano Regina Resnik taped a recording of Adriana Lecouvreur on her cassette and is now using it to learn the role she will sing next season at the Met.

But what is really new about cassettes is their use as a vehicle for commercially recorded music. Philips, the giant Netherlands electrical manufacturer that originally developed them, has found a vast and expanding market in European homes. This year alone, the firm will turn out a million players and 9,000,000 cassettes containing 2,000 titles drawn from 90 record labels. Spurred by Philips' success, at least 40 other companies in the past year have begun moving their own cassette equipment into the U.S. market. By year's end, more than 1,000 titles will be available on cassettes in the U.S., priced mostly at \$5.95 (v. an average of \$6.95 for cartridges). And next year both Ford and General Motors plan to introduce cassette players as optional equipment in their new cars.

Sights & Sounds. The tape field is already crowded and confusing, and the technology—for cartridges as well as cassettes—is progressing rapidly and unpredictably. Some segments of the U.S. record industry, led by Columbia, Capitol and especially RCA Victor, are still betting heavily on cartridges, partly because they fear that the cassettes' potential as a home recording device would tend to undercut disk sales. On the other hand, many industry sources privately agree with the prediction of Rein Narma, consumer-products manager for

Ampex, which markets all three types of tape. "We believe very strongly," says Narma, "that the cassette will be the eventual surviving tape format, and it is possible that within ten years it will make major inroads into the disk format."

Even if cassettes do not eventually triumph in this field, Philips Executive Anton van den Brink points to another major role for them that may be no more than five years away: the video tape cassette, which would be hooked into television sets to provide an almost unlimited range of sights simultaneously with sounds.

Stereo Grows Up

To the 1958 High Fidelity Music Show in Manhattan last week trooped more than 50,000 audiophiles who wanted to hear "the new dimension in sound," stereophonic records and tapes. Spread over five floors, the 125 exhibitors concentrated on showing the fast growth of the new art. General Electric showed only stereophonic components; Massachusetts' small Wright St. George Laboratories displayed an inexpensive (\$65), thin (1 7/8 in.) picture-frame speaker that can be secreted behind curtained walls or prints, is well suited for stereo,* which requires at least two speakers some distance apart. This year, sales of such stereo gear will help swell the music market by \$50 million, to \$450 million or more.

Ampex, Revere, Bell Sound Systems, Wollensak, Webcor are selling stereo tape players. Stereo record players (price: \$125 to \$2,500) are being pushed by Pilot, Columbia, Zenith, RCA Victor, Emerson and others. Into the market for stereo records have come Columbia, RCA, Angel, London, Audio-Fidelity.

Two Systems. Yet many music lovers have held back from buying stereo because there is such a wide variety of systems to choose from, and buyers are wary lest they get trapped in a battle of speeds such as the old 33 1/3-45-78-r.p.m. fight in records. Last week's show demonstrated that the industry has pretty well shaken down to playing two systems.

For records, companies agreed to adopt the "45/45" system, in which each record groove is pressed with two sound tracks, angled at 45°. Thus one machine will play most stereo records. Stereo sounds richer on tape, although sales of stereo tapes this year will hit only about \$3,000,000 because they are tough to thread and are expensive (about \$16.95 for 60 minutes' playing time). But major companies are now planning a simplified tape system.

Blades Before Razors. RCA Victor last week brought out a magazine-load cartridge that eliminates the shortcomings of spool tape. This month RCA will put on the market a broad library of classical and popular stereo magazine tapes in four sizes and prices, from \$4.95 for 22 minutes to \$9.95 for 60 minutes. Player sets for the cartridge tapes will come out later because producers, such as Motorola, insisted that RCA first put out enough tapes to make a market. RCA's own magazine-tape playing system will come out by Christmas, retail for \$295 to \$450.

To spur stereo broadcasting, the Federal Communications Commission granted permission for FM stations to test stereo "multiplexing," a system that sends the two separate signals over a single radio frequency. New York City's WBAI started to broadcast stereo last week; WRCA-FM will begin next week. Manhattan's two-year-old Madison Fielding Corp. last month put out a multiplex stereo adapter that can be attached to any FM radio, turn it into a stereo set. Price: \$49.95.

* Stereo achieves a full concert-hall quality by reproducing two separate sound tracks, which the human ear combines, just as the eyes do for stereo photos to create a better image. In recording, at least two microphones are used, each stationed at different points to pick up the varying shades of sound.