ELECTRONICS

TV by Magnetic Tape

Attempts being made to develop methods of putting television programs on magnetic tape, a scheme that offers many advantages over movie film now used.

➤ TELEVISION ENGINEERS are striving to put video programs on magnetic tape. If they succeed, spot news may reach your screen in the future much faster than it gets there now by film.

Furthermore, if the engineers can iron out some of the technical wrinkles, tape-recorded programs probably will slash video station operating costs by doing away with the waste of used movie film.

To date, the much-talked-about system of recording sight on magnetic tape has not materialized commercially. But at least three tight-lipped companies have been reported to be working on such a TV sending system.

The tape-recording equipment probably will be connected directly to the output of the television camera's video amplifier. After the picture has been recorded, the tape will be played back on a machine that feeds the "canned" picture to another video amplifier for broadcasting.

Tape offers these advantages over movie film: It is ready for instant playback after recording, since it does not have to be developed. It can be used over and over instead of being thrown out after the telecast. Furthermore, tape costs less than movie film and requires less storage space. But video tape-recording equipment probably will come with a high price tag.

Television tape recordings would not look so very different from the tape recordings now made by thousands of Americans on their own home outfits.

The tape might be wider than the present variety, and it might run through the machine a little faster. But essentially a video tape recording would resemble an ordinary home-recorded tape of Junior playing the piano.

The big difference lies in the recording equipment needed to put the complex video signals on the tape.

Tape machines that record sound merely have to handle signals up to about 15,000 cycles per second. But video tape recorders, due to the complex technical nature of television, would have to handle everything from zero to 4,000,000 electric "pulses" a second.

By "trick" recording methods, engineers have found they can put 1,000,000 pulses on a tape one inch wide. On tapes four inches wide, they can record the 4,000,000 pulses. The catch comes in finding the proper trick recording system.

Home tape recorders merely amplify the sound picked up by the microphone. Using a tiny electromagnet, the machines deposit the sound on the tape. But the video signals rush in to be recorded so fast that such a simple system would be swamped.

One experimental technique "samples" the picture about 300,000 times a second instead of, say, 4,000,000 times. That trick seems to offer promise.

Although tape holds many advantages over film as a recording medium for television, its future still is uncertain. Research engineers hope it will do what they think it will, but as one put it, "We won't know until we try it out."

Science News Letter, November 15, 1952

NUTRITION

Figure Cost of Eggs On Basis of Weight

➤ MOST AMERICANS like fried eggs for breakfast and hardboiled eggs for picnics. But there are hundreds of other ways of using eggs, and since they are a high quality, complete protein food, it will pay the housewife to look into some other ways of serving them.

They supply all the essentials for the building and repair of body tissues as well as valuable vitamins and minerals. They can be used in place of meat and even when eggs are high, they may be a better buy for a main course dish than meat.

When buying eggs, figure the cost on the basis of weight rather than by the dozen, advises Elizabeth E. Ellis of the University of New Hampshire. A comparison of the cost per pound of the different sizes will readily show which size eggs are lowest in price, and will enable homemakers to select the eggs which will give the most value for the money, she says. For example, if eggs are selling at 60¢ a pound, then the small eggs will be 68¢ a dozen, the medium eggs 80¢ a dozen, and the large eggs 90¢ a dozen.

Buying eggs by grade is another way of being sure you are getting the quality you are paying for.

Remember that refrigerated eggs keep their quality longer than eggs kept at room temperature. So look for the ones in the refrigerator when you go to market, and put them in your own refrigerator when you get them home.

Be careful, too, to handle the eggs gently. Jarring or jouncing breaks down their quality. Even if it does not crack or break the shell, it may cause the white of the egg to lose much of its firm, upstanding quality. So protect the delicate structure inside the egg as well as the shell when you handle it.

Science News Letter, November 15, 1952

NOBELIST FELIX BLOCH—Originator of a new technique of qualitative analysis by nuclear induction, Dr. Bloch of Stanford University, California, here examines part of a working model of equipment used in his research.

GENERAL SCIENCE

Science Manpower Body Urges Best Defense Use

➤ A SCIENTIFIC Manpower Commission to combat the "ignorance or indifference commonly displayed" in the military and in Congress as to the uses for defense of scientific and technological personnel is being set up by six of the most important scientific bodies in the nation.

The new commission, according to an announcement, will conduct a "program of public education that will inform the public and their representatives in the Congress regarding current needs, prospective or actual shortages of manpower, and such other personnel matters as may bear upon the defense situation and the national welfare."

"Widely divergent opinions" regarding the relative importance of military service as compared with scientific and technological service in the present emergency will be dealt with by the new body. The six groups sponsoring the commission are: The American Chemical Society, the American Geological Institute, the American Institute of Biological Sciences, the American Institute of Physics, the Federation of American Societies for Experimental Biology and the American Association for the Advancement of Science. The commission is expected to set up shop in about 60 days.

Science News Letter, November 15, 1952

PHYSICS

Nobel Physics Winners

For finding ways of learning some of the secrets locked in the nuclei of atoms by tuning in on radio frequencies, Drs. Felix Bloch and Edward M. Purcell are awarded Nobel prize.

➤ A WAY of tuning in by radio frequency on the heart or nucleus of the atom to determine the mysterious and strange forces within it has won for two American physicists the 1952 Nobel prize for physics. Nuclear properties of the atom are keys to future atomic progress.

Independent work along the same lines was done by Dr. Felix Bloch, Stanford University professor of physics, and Dr. Edward M. Purcell, Harvard University professor of physics (see p. 319), who share the prize worth about $33,000.

Atomic particles spin and carry electric currents. They thus behave like small magnets. Placing these invisible magnets in an alternating magnetic field gives rise to electric forces which can be measured by short radio waves. New information about the structure of matter has been discovered by varying the electric and magnetic forces to which atomic magnets respond, and measuring the time necessary for the tiny magnets to respond.

One application of the method by Dr. Purcell was the prediction of invisible hydrogen gas in the space between the stars of the Milky Way and the detection of its radiation with a radio telescope.

The phenomenon is known as nuclear induction or nuclear magnetic resonance induction. Amplified radio frequencies reproduced on an oscillograph screen show the observer what frequency the atom responds to. Each element has a characteristic frequency to which it resonates in a magnetic field under the influence of radio-frequency electric current.

Dr. Bloch was born 47 years ago in Switzerland and came to this country from Germany in 1933. Dr. Purcell is 40 and a native of Illinois with his undergraduate degree from Purdue.

Science News Letter, November 15, 1952

NOBELIST EDWARD M. PURCELL—For his work in helping to unravel the mysterious forces of the atom's nucleus, Dr. Purcell of Harvard University, was awarded the 1952 Nobel prize for physics.

CHEMISTRY

Nobel Chemical Awards

Two British biochemists, Drs. R. L. M. Synge and A. J. P. Martin, receive Nobel prize in chemistry for development of chromatographic separation processes.

➤ CHROMATOGRAPHY, THE process developed by British biochemists Dr. Richard Lawrence Millington Synge and Dr. Archer J. Porter Martin, this year's Nobelists in chemistry, is fundamentally as simple as blotting ink or mopping up spilled milk. The fibers take up the liquid, as everyone knows. Only the scientist stops to ask how this happens and where the liquid goes.

Drs. Synge and Martin adapted chromatography and extended it to produce new information about albumin and other life substances. Chromatography is a process in which colored extracts, originally of grasses and flowers, are observed to separate into two or more bands of different colors as they trickle down inside a long glass tube filled with some kind of insoluble filtering material, similar to fine sand.

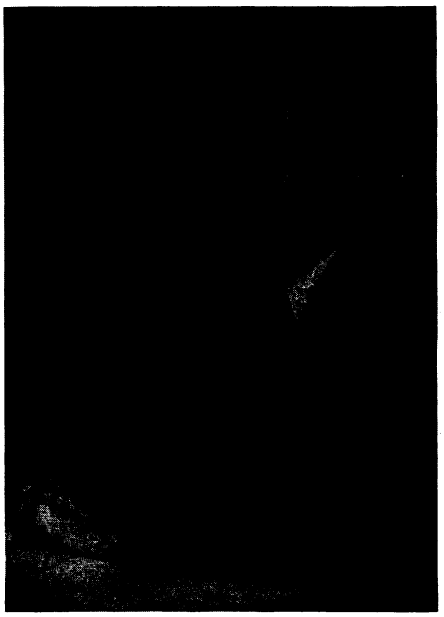
In this form, the principle was used by the Russian botanist, Michael Tswett, in 1904, to learn the constitution of the green coloring matter of grass and leaves. Newer adaptations of the method are used for many colorless substances, but the name chromatography has stuck with the process.

As used by Drs. Synge and Martin, the tube of sand is replaced by the fibers of fine filter paper. A drop of solution taken up by a strip of such paper will spread along the fibers.

Just as the green grass extract separates into different bands of greens and yellows as it trickles down the sand-packed column, the solution of albumin, in their experiments, separates as it travels along the filter paper until what started as a homogeneous mixture ends as a series of bands each composed of a pure substance.

The mixture has sorted itself out because each of the substances in it has its own rate of travel. When enough time has gone by, the zones of paper containing the separated substances may be chipped apart and the substances recovered by dissolving them in suitable liquids, or they may be tested in other ways while still on the paper. The spread-out material on the paper is called the chromatogram.

Refinements of the process consist of enclosing the apparatus so as to keep the material in an atmosphere where the concentration of solvent is high, so the solution will not dry out too quickly, and using a wide variety of solvents to keep the boundaries of the separated materials moving as the researcher wishes.



NOBELIST RICHARD L. M. SYNGE—Honored with Dr. Archer J. P. Martin for the seemingly-simple discovery that ordinary filter paper may be used for chemical analysis was Dr. Synge.

Dr. Martin, 42, is now at the National Institute for Medical Research, London, and Dr. Synge, 38, is at the Rowlett Research Institute, Scotland.

Science News Letter, November 15, 1952