

TECHNOLOGY

No Cheating Pay TV

➤ EVEN AN EXPERT puzzle-solver will find it almost impossible to beat the controversial "pay-as-you-watch" television system, if and when the Federal Communications Commission permits operation.

The Zenith Radio Corporation, which developed one subscription TV system called "Phonevision," employed expert cryptographers and engineers to make it hard for the viewer to cheat.

Special programs would be sent over the regular TV channels in the system, but only those who pay to find out the code number, different for every program and every set, will be able to enjoy the show. Others would see a garbled picture. The viewer could tell he is missing a Western, but the picture and sound would be not only unintelligible but unpleasant.

99,999 Possibilities

The crudest code-beating technique is to try all the combinations until a clear picture is received. There are, however, 99,999 possible code numbers for each program, enough to discourage even the hardiest.

The more enlightened puzzle fan might join with his neighbor who also likes problems to work out the relationship between

the code numbers for the two sets. When the problem is solved, only one would have to pay to learn the code number for both. This is possible, but it would take a long time, according to the system's designers.

No information about the code number can be obtained from a garbled picture, and every wrong combination produces a picture just about as bad as any other.

Here is how the system works:

The picture on a receiving set is actually many individual frames following in quick succession. In between each frame, the system sends a ten-impulse code that sets your decoder for unscrambling the next frame. The scrambling is done by displacing 16-line sections of the picture horizontally in a random order. Thirty-two different scrambling variations are used.

The broadcast signal for Phonevision, although almost exactly like the regular signal, requires special equipment that will panel a large wall.

The garbled picture looks somewhat like a checkerboard with the boxes moving up, down and sideways. Viewers would find the code number for each desired program from a punchboard card, which would also be used for billing.

Science News Letter, August 20, 1955

ICHTHYOLOGY

Eel's Appearance Puzzles

➤ SCIENTISTS WERE puzzled by the appearance of thousands of eels at the landlocked mouth of Lake Coila in southern New South Wales. Eel heads protruded above the water like a forest of blackened twigs.

The sea was calm and a big stretch of sand separated lake and eels from the ocean.

The eels, up to five feet in length and some weighing 30 pounds, began to churn back and forth across the waters of the lake, which is near the mouth of the Tuross river, 13 miles from Moruya. Within three days a storm lashed the coast, bringing waves across the beach, over the low-lying sandhills and into the mouth of Lake Coila.

Then a squiggling, squirming mass of eels made an exodus into the sea. When the waves receded, hundreds were left stranded on the sandhills between the lake and the sea.

Harold Phippin, a local resident, said that it was a "fantastic sight" to see a lake about seven miles around full of eels.

The experts do not know what instinct brought the eels to the lake nor why it is that eels seem to carry built-in tide and storm predictors. They agree that the Lake Coila eels were off to their traditional breeding grounds at sea at an unknown site.

Australian Museum ichthyologist Gilbert Whitley said the breeding ground "is prob-

ably off New Caledonia," about 1,000 miles northeast of Australia.

He said that the females, fattening up in the fresh water streams, pick up the males from around the estuaries and head back to the breeding ground about every 13 years.

In the deep of the breeding ground, the eels develop large eyes. They lay an egg that floats to the surface, where the elver begins growing. The elvers then work their way back to the Australian coast.

Science News Letter, August 20, 1955

MEDICINE

Blood Test Shows Extent Of Heart Muscle Damage

➤ A BLOOD TEST for the extent of heart muscle damage in heart attack victims is now ready for use by practicing physicians, the National Heart Institute, Department of Health, Education and Welfare, has announced.

Need for expensive research laboratory equipment has been eliminated in the simplified version of the test developed and evaluated by Dr. Daniel Steinberg of the National Heart Institute, Bethesda, Md., and Dr. Bernard Ostrow of George Washington University, Washington.

The test determines the amount of an

enzyme, transaminase, in the blood when bits of heart muscle have died as a result of clogging of an artery supplying these parts of the heart with blood. The test was first developed by scientists at Sloan-Kettering Institute in New York (see SNL, June 18, p. 389).

The test does not replace the electrocardiograph now widely used to determine heart damage. Instead, it is expected to supplement this, giving more precise information about the extent of permanent heart damage and consequent chances for recovery of the patient.

Details of the modified test are reported in the *Proceedings of the Society for Experimental Biology and Medicine*.

Science News Letter, August 20, 1955

BIOCHEMISTRY

Hydrogen Balance May Be Clue to Epilepsy

➤ THE DELICATE BALANCE between charged hydrogen atoms in the blood and those in the brain fluid may be related to epileptic seizures and other brain disorders.

This has been suggested in research by Dr. Robert Tschirgi and associates of the Medical Center on the Los Angeles campus of the University of California.

Studies performed under a U. S. Public Health Service grant have shown that a slight change in the ratio of hydrogen ions in the blood and those in brain fluid will change the electrical potential between the two fluids. Such changes can be measured by inserting tiny electrodes in the brain and in the vessels that serve the brain.

There is a barrier between the blood vessel and the moat of fluid that surrounds brain cells. These hydrogen ions apparently cannot pass through the barrier on their own. In the barrier, however, may be tiny pumps that can force the ions through the barrier when necessary.

Dr. Tschirgi's studies have suggested that when these pumps break down, the delicate balance of the hydrogen atoms between the blood and brain is upset. This may initiate epileptic seizures and other brain disorders, he suspects.

Science News Letter, August 20, 1955

One *cave* in the Lava Beds National Monument contains a frozen waterfall and a river of ice that never melts.

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