BIOLOGY

Behavior of Living Cells Linked to Mathematics

THE mysteries of protoplasm, the secrets of life, seem far removed from the cold abstractions of mathematics. In the popular mind, biology and mathematical physics are about as far apart as any two sciences could be.

But scientists are not letting them remain so. One of those who, by means of mathematics, are increasing our knowledge of living matter is Dr. N. Rashevsky of the University of Chicago.

One of the foremost characteristics of a living thing is its ability to reproduce its own kind. In the simplest forms of life—in organisms consisting of a single cell—this is accomplished merely by the cell dividing into two. Food is absorbed through the cell wall and presently, when the individual has become quite "grown up," it splits into two and the process begins over.

One question which scientists must eventually settle is this: "How completely can the behavior of living cells be explained by our knowledge of physics and chemistry?"

In his work on this vital question, Dr. Rashevsky has not used test tubes, nor has he studied cells under a microscope. His only instrument has been high-powered mathematics. Among his many contributions so far has been the mathematical proof that certain tiny droplets of "non-living" matter will absorb "food" from a solution, will grow until a certain size is reached, and then will divide. And the size to which they grow is nearly the same as that of living cells.

Remarkable Resemblance

While no forces or influences other than the well-recognized ones of physics and chemistry are invoked, his non-living "paper and pencil models" show remarkable resemblance to living cells.

A further resemblance is their inability to form spontaneously. They must either be created by some outside agency or else be natural offspring of their "parents."

Many living cells, of irregular shape when alive, become spherical after death. In this respect also has Dr. Rashevsky shown that non-living matter can do the same thing. That is, he can design cells which will be non-spherical while absorbing food but which will become spherical if for any reason the food intake is stopped.

He would deny, however, that he has "explained" life processes. He has proved, nevertheless, that such processes as cell division do not necessarily involve any other influences than those which govern the behavior of non-living matter.

Science News Letter, November 28, 1936

RADIO

Months of Research Have Brought Television Near

FOUR MONTHS of field tests in television broadcasting from New York's Empire State building at the cost of a million dollars have brought television for the public nearer to reality.

The Radio Corporation of America and the National Broadcasting Company have drawn the veil of secrecy that has surrounded these engineering tests of modern, electronic television.

Despite the advances revealed, you won't be able to go downtown and buy a television set, plug it in and enjoy broadcast sight as well as sound. Not yet awhile.

Even the RCA-NBC engineers say that they have not yet finally designed the television sets that will be sold for the general public. The definition of the image, technically known as the lines, will be 441 in future public television instead of the present experimental 343 interlaced lines.

A decade ago there was a flurry in radio over the supposed imminence of commercial television. It was wonderful, the television of even those early days. But the systems and methods of so long ago have changed. Then television was mechanical and now it is electronic. Streams of electrons are key actors in television today.

Television as demonstrated by RCA was seen on a new 12-inch receiving tube. And the images were in black and white, instead of the greenish tone of previous cathode ray tubes. The screen was 7½ by 10 inches and a fairly large group could watch the show at the same time.

Image and sound were perfectly synchronized. To do this a system is necessary in which there are 1,400,000 impulses amplified and broadcast in one second.

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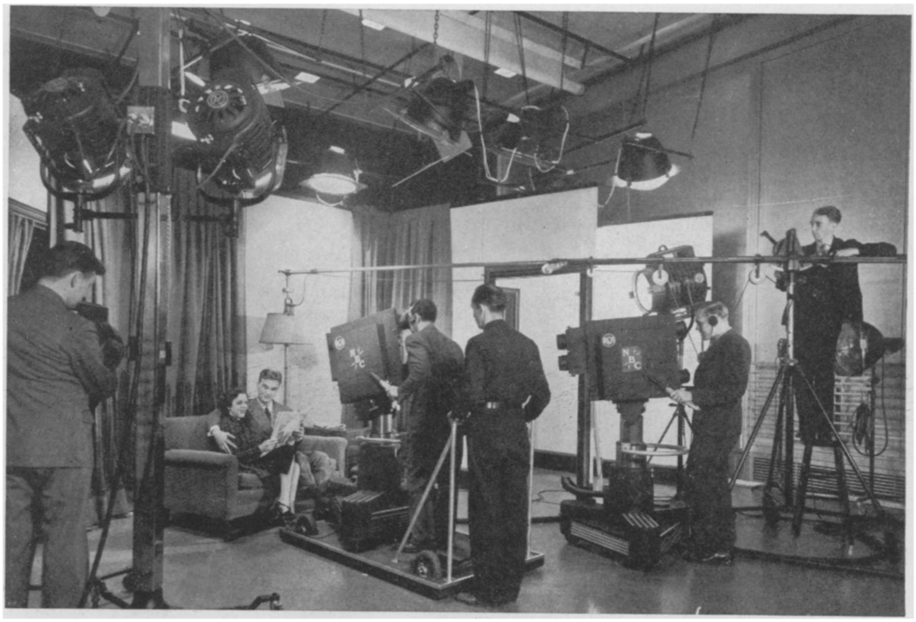

GOING ON THE AIR

A television studio looks like a movie set with its lights and cameras. The camera at the left is mounted on a dolly so that it can be moved back and forth for distant or close-up shots without break in the broadcast. The microphone hangs high beyond the eye of the camera.

COMING IN

Here is the 1936 television receiver. The mirror in the lid of the instrument forms a sort of screen, reflecting the images as they are received.

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16-year-old compatriot of the Count of Covadonga. A blood transfusion was given at the time of the operation as a precautionary measure. There was no hemorrhage either during or following the operation and the wound healed normally.

Removal of the thumb was required because hemorrhage into the joint had destroyed the joint and bone tissue and resulted in a tumor containing blood which was very painful and threatened to burst through the skin.

Coagulation of the tissues by electricity at the time of the amputation not only prevented hemorrhage but greatly reduced the clotting time of the patient's blood, Dr. Woodhall reported. The blood in hemophiliacs clots very slowly, and that is why small cuts or injuries may result in loss of so much blood that the patient dies. Before the amputation, a sample of the Spanish lad's blood took five hours to clot. After the amputation, this time was reduced to five minutes.

This suggested that the cauterization by electricity mobilized the thromboplastic substances in the body which make blood clot when it is shed following injury. To test this theory, a small portion of skin and tissues beneath it on the right thigh were partially cauterized a month after the amputation. On the third day following this, the clotting time had fallen from four and a half hours to three and a half