PHYSIOLOGY

Life Begins On Spring-Like Coils

LIFE begins with spiral springs, it appears from researches of Dr. W. D. Francis of the Botanic Gardens of Brisbane, Australia. (*Science,* Feb. 10).

Dr. Francis has made minute examinations of the protoplasm of various kinds of cells, ranging from bacteria to onion cells, and states that a spiral structure is characteristic of all. He also cites support for his thesis found in the published work of other investigators.

This spiral, spring-like structure of protoplasm, he declares, explains the great elasticity of this living substance.

Science News Letter, February 25, 1939

RADIO

Radio Tube for Altimeter Generates a 14-Cm. Wave

A PRACTICAL radio tube generating an ultra short-wave but five and a half inches long—short enough for the radio echo altimeter now under development to show pilots how high they are above the ground and to warn them of other planes nearby—is announced by two engineers of the General Electric Company, W. C. Hahn and G. F. Metcalf.

Its waves, a fourth as long as the waves now used in experimental echo altimeters, can be directed like the beam of a searchlight, the two engineers said. Waves as short as a single centimeter—about two-fifths of an inch—can be generated by a tube working on the same principle. The shortest wave received on a home radio set is about five meters, or more than 15 feet.

The tubes can also be used for guiding ships through dense fogs by enabling them to measure the distance to land or other vessels.

Science News Letter, February 25, 1939

LIKE A SPINET

Laurens Hammond, inventor of this new electric musical instrument, watches as his player demonstrates how it is operated.

ENGINEERING—MUSIC

Electric Musical Instrument Imitates Orchestra Pieces

In Appearance Like an Old-Fashioned Spinet, Novachord Will Make Possible Entirely New Types of Compositions

NEW types of musical compositions, employing tones never heard before as well as the tones of more than one instrument for a single player, are now possible through development of a highly versatile electrical instrument — the Novachord.

Looking for all the world like an old-fashioned spinet, it made its bow in Washington, D. C., by pouring forth the varied notes of a piano, violin, Hawaiian guitar, harpsichord, clavichord, trumpet and French horn.

The Novachord uses vacuum tubes instead of piano or violin strings or the pipes of a wind instrument. It was invented by Laurens Hammond, inventor of the Hammond electric organ, which likewise uses electric currents to produce its music instead of the familiar banks of pipes.

Requiring only to be plugged into a household light outlet, the Novachord is smaller than a grand piano. It contains no pipes, reeds, strings, hammers or vibrating parts. It has a keyboard of 72 notes which are, however, played exactly like a piano and has the regulation piano sustaining pedal and a pedal for controlling volume.

Punching the keyboard and using the other controls determines the type of electric wave generated in the vacuum tubes. This electric wave is then converted into sound in much the same method as a radio.

Its imitating abilities it owes to the fact that the person playing it can change at will the two chief varying characteristics which give each musical instrument its identity, it was explained. A group of controls mounted on the front panel above the keyboard makes this possible.

An instrument's distinctive sound is

determined by tone color—the basic tone plus the harmonics of that tone—and the "envelope"—the speed with which a note is built up and dies away. Percussion instruments such as the piano give a tone which starts almost at its height and dies away gradually. String tones are built up and die gradually.

One group on the left controls the actual tone color, while the other varies the "envelope." The player can thus pick the tone color and "envelope" he desires.

Mr. Hammond does not consider the Novachord strictly an imitative instrument. It does, however, bring up distinct new possibilities for varied orchestral effects and for greater diversification of home entertainment.

Science News Letter, February 25, 1939

PHYSICS

Tests Show 200-Year-Old Paper To Be Good as New

PAPER more than 200 years old has been found by National Bureau of Standards tests to be almost as good as when made. A page from a book printed in 1722 was subjected to the standard accelerated aging test, heating for 72 hours at the temperature of boiling water. The rag fibers of the paper were found practically in perfect condition; the loss of folding endurance after test was only three per cent.

Science News Letter, February 25, 1939

INSIDE

Under the case, the resemblance to a spinet ends. Mr. Hammond (right) explains to an interested group the workings of the vacuum tube "strings" in his Novachord.

PSYCHIATRY

Adolescent Crime Has Its Beginnings in Babyhood

A MASKED bandit enters the lonely filling station and points a gun at the proprietor. Quick action results in the capture and unmasking of the culprit. One expects to see revealed a man hardened in crime. But, no, most likely, it is a youngster in his teens, and off he goes on the first leg of that long journey that leads so many to reform school, jail, and prison.

Why are so many criminals young adolescents? Does adolescence itself produce crime? These questions were put to Dr. Ben Karpman, of St. Elizabeth's mental hospital, experienced with criminals and the mentally abnormal.

His reply is characteristic of the physician.

"Diseases are preceded by an incubation period," he said in the journal *Mental Hygiene*. "You may find that the measle rash on a child appeared on a certain day, but the disease was no doubt contracted perhaps several weeks before. In mental diseases the incubation period is much longer.

"I submit, therefore, that it is not possible to speak of adolescence as a stage in which crime finds its first expression, but rather that we have to go to the earliest stages of the child's development in order to uncover the true period in which the anti-social behavior began."

Responsibility for a child's development of criminal behavior is placed squarely upon the family by Dr. Karpman. A broken home is particularly culpable—not just a home deprived of one of the parents, but a home which the child feels for some reason does not belong to him. Affection is essential.

"The making of a good citizen can be traced directly to his early years, and to his reaction to the affection given by the various members of the family . . . .

"The responsibility of the family is grave. It cannot be denied that criminals develop through failure on the part of the family to provide binding emotions, necessary to keep the child within the family."

Science News Letter, February 25, 1939

PHARMACY

Profession of Pharmacy In Need of Recruits

IN THESE days of overcrowded ranks in many professions, it is both interesting and gratifying to learn that one of the oldest, pharmacy, is sending out a call for recruits—not to swell the ranks of clerks in department drug stores, but to join with physicians in healing the sick.

A shortage in the supply of "properly qualified pharmacists available for active service in professional practice" exists in New Jersey, Delaware and Pennsylvania, the Philadelphia College of Pharmacy and Science reports.

Part of this shortage is due to more stringent requirements for entrance to pharmacy colleges, more rigid regulations of pharmacists by state boards and the lengthening of the professional course in pharmacy to four college years. Another factor is the general economic improvement which has caused a return of pharmaceutical retail practice to predepression levels and which has increased the demand for trained pharmacists in other fields.

On the economic side, a career in pharmacy looks bright. It will be at least four years, it is estimated, before enough new pharmacists have been

See Page 127-128 For Book Reviews