

PHYSIOLOGY

Brain Research Needed

► A NEW KIND of warfare fought by manipulating the minds of men with chemicals or other means was foreseen as possible by Dr. Leonard Carmichael, Secretary of the Smithsonian Institution, Washington, D. C.

He said it was conceivable that modern research in brain study could lead to "novel techniques" for altering individual behavior. Russia, not the U. S., leads the world in many aspects of brain research, Dr. Carmichael warned.

He urged the free world to do more than it has in the recent past to support "comprehensive programs of scientific study in this complex and often tantalizing" field of brain research.

Dr. Carmichael told the Borden Centennial Symposium meeting in New York that Russia has an "elaborate and intricately formulated" program of research in the higher nervous functions and in the physiology of behavior. Attention should be paid to the possibility of something called "pharmacological warfare," which might require pharmacological countermeasures.

New scientific knowledge of the brain may be used to help cure or prevent the

scourge of mental illness or to make men betray what they hold dear, Dr. Carmichael pointed out. The symbolism of the electrically recorded physiological reactions radioed back to earth from the first Russian dog in outer space should not be disregarded.

Dr. Carmichael said he had recently examined four large volumes, each about the size of the New York telephone book, containing English translations of Russian studies on the central nervous system and behavior during 1957.

Research on the effects of pharmaceutical products on higher nervous activity and on the behavior of the organism as a whole occurs "over and over again" both in outlines of future programs and in reports of recent experimental results.

Speech in Russia is studied not only by philologists or social scientists but also quantitatively and physiologically. If thinking is related to silent talking, Dr. Carmichael warned, "this study may be a little ominous for a world that has learned to fear forced confessions and standardized intellectual attitudes."

Science News Letter, April 26, 1958

ASTRONOMY

Length of Day Increasing

► THE LENGTH of a day has been increasing about half a thousandth of a second a year since September, 1955, two British and two American scientists report.

They spotted this irregular variation in the earth's rotation rate by comparing the time kept by an atomic clock with the time kept by the earth itself as it turns on its axis. This latter is known as Universal Time.

Atomic clocks are based on the natural frequencies of vibrations of atoms. The atomic clock of the National Physical Laboratory used in this cooperative study uses cesium atoms, and is accurate to one part in ten billion. The Universal Time is based on observations made with the U.S. Naval Observatory's photographic zenith tubes at Washington, D.C., and Richmond, Fla.

The intervals between time signals from radio station WWV in Washington are measured in terms of the cesium atomic clock and Universal Time, then compared.

The scientists also investigated the well-known seasonal variation—a regular change in the length of a day of about a thousandth of a second a year, believed due to winds. They found the seasonal variation as determined by the cesium atomic clock is virtually the same as that determined with quartz crystal clocks for several years prior to 1955.

Drs. L. Essen and J. V. L. Parry of the National Physical Laboratory, Middlesex, England, and Drs. William Markowitz and R. G. Hall of the U.S. Naval Observatory made the comparisons. The work they

report in *Nature* (April 12) is an intermediate step in establishing the frequency of a cesium atomic clock in terms of the second of Ephemeris Time, which is based on the orbital motion of the moon.

There are three kinds of variations in the earth's rotation speed: secular (progressive), irregular and periodic. The first, due to tidal friction, is too small to be significant in their time studies.

Irregular variation refers to departures from the average speed of rotation that continue for about five or ten years. This effect has been suspected but not previously observed in detail. If the speed of rotation decreases, the length of day increases.

Periodic variations in the earth's rotation speed have been found with intervals of one year, one-half year, 27.6 days and 13.6 days. The first two are the seasonal variations. Both these and the shorter periods were removed in computing the changes in the earth's rotation speed.

Science News Letter, April 26, 1958

PHYSIOLOGY

Give Mice "Hotfoot" To Test Tranquilizers

See Front Cover

► SCIENTIFIC "hotfoots" make hotheads of mice.

The electric "hotfoot" is being used as a test for tranquilizing drugs, a team of scien-

tists from Smith, Kline & French Laboratories told the Federation of American Societies for Experimental Biology meeting in Philadelphia.

In operation, a pair of normally tranquil mice are placed on an electrically charged grid surrounded by a large glass beaker that serves as a type of boxing ring. The hotfoot is then administered five times every second.

When first placed in the "ring," the mice jump around to try to avoid the shock. But after a brief period, the mice "converge at close quarters, stand face-to-face on their hind legs, and spar and bite savagely at one another."

To the casual observer, according to the scientists, the mice appear to be blaming each other for their predicament and have decided to hit back.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows two normal mice, untranquilized with drugs, sparring like boxers. They are standing on an electrically charged grid.

When given various tranquilizers and other drugs that depress central nervous system activity, the mice still jump but they do not fight.

The "mouse rage" test is being used as part of a battery of animal behavior tests to get a pharmacological profile of a drug before the same compound is tried on humans.

Dr. Ralph E. Tedeschi, Miss Anna M. Mucha and Dr. David H. Tedeschi reported on the shocking-mouse experiment.

Science News Letter, April 26, 1958

NECROLOGY

Lark-Horovitz, Physicist, Dies After Long Illness

► DR. KARL Lark-Horovitz, head of the Purdue University physics department, died April 14 at the age of 65.

A member of the Board of Trustees of SCIENCE SERVICE for almost ten years, Dr. Lark-Horovitz was internationally known for his researches on semi-conductors, nuclear physics, X-ray crystal structure, and for his early work on glass.

Science News Letter, April 26, 1958



KARL LARK-HOROVITZ — Internationally known physicist, Dr. Lark-Horovitz, died on April 14.