

Do You Know?

The first known *wheeled vehicles* were used in Babylonia about 3000 B.C.

Ice cream production in the United States increased more than 50% from 1936 to 1941.

Cactus species that bloom at night usually have white, scented flowers, while day bloomers usually have flowers of brilliant colors.

Chestnuts may be used for washing clothing, a Netherlands paper says; the kernels are grated and then boiled and mashed through a sieve into warm water for the washing.

Citrus trees are treated with hydrocyanic acid spray one year and with oil spray the next because *parasites* seem to build up resistance to poisons used year after year.

Over 3,000,000 *fish* from federal hatcheries were released in 39 states in farm stock-water and other ponds in 1943; most of them were large mouth black bass and bluegill sunfish.

Oiticica oil, a pale viscous liquid obtained from the seed or nut of the Brazilian oiticica tree, can take the place of tung oil for many purposes; imports from Brazil are increasing.

Defatted *corn germ*, now coming into production as a new human food as rich in proteins as beef, is made from the small yellow nuggets in the corn kernel by extracting the corn oil.

Lecithin, a colorless viscous phosphorized fat produced by animals and plants, is used in the food and confectionery industries as an emulsifier or dispersing agent; it protects freshness.

Wood, impregnated with the components of certain synthetic resins and subjected to heat, becomes plastic and while the resin is being formed can be compressed to one-third the original volume.

Shoe production in the United States in 1943 dropped less than 5% from the 1942 amount; over 10% of the 1943 production consisted of military shoes and approximately 8.5% were non-ration types.

PHYSICS

Theory of Gravitation

Electromagnetic space-time forms basis of hypothesis recently advanced by Harvard mathematician, working with scientists in Mexico City.

➤ A THEORY of matter, electricity and gravitation, based on electromagnetic space-time has been recently advanced by Dr. George D. Birkhoff, Harvard University mathematician, who is spending several months in Mexico City.

Built upon the electromagnetic framework of the special theory of relativity, Dr. Birkhoff uses one dimension of time and three of space to express his equations. No difficulty is encountered in incorporating electromagnetic as well as gravitational forces in the new theory.

The electrical charge is thought of as invariably attached to the "perfect fluid" which he uses as a model. This perfect fluid is one in which the velocity at which a disturbance moves exactly equals that of light, Dr. Birkhoff states. It is conceived of as only filling part of electromagnetic space-time and as being mobile and dynamic. From a mathematical point of view the fluid has been found to be a satisfactory form of matter.

Dr. Birkhoff's gravitational theory, based on the perfect fluid projected against the flat space-time of the special theory of relativity, grew out of a request from his Mexican colleagues that he present a paper at the Astrophysical Congress held in Mexico in 1942. Since his arrival in Mexico he has been collaborating intensively with Professors Manuel Sandoval Vallarta, Carlos Graef and Alberto Barajas of the National University of Mexico, and further significant progress has been made.

The photon has turned out to play a natural role in the theory; and the fundamental problem of two or more bodies has proved to be amenable to direct attack, because of the simplicity of the

equations involved. Other important problems, such as the unexplained irregularities of the motion of the moon are, also, being studied in the light of Dr. Birkhoff's theory.

Not only is the theory in perfect accord with ordinary gravitational phenomena, but it explains in another way the three most delicate effects of the famous Einstein theory of 1916. While the new theory presupposes an absolute reference system of space-time similar to that of Newton, but of an electromagnetic nature, Einstein's theory presupposes a curved space-time, changing at every moment.

Physical theories of relativistic type are likely to be of use for theoretical astronomy only in cases when large velocities enter and the minute gravitational effects involved can be observed. It seems probable, however, that they may be important in the domain of atomic physics.

Such relativistic theories seem more in accord with the electromagnetic structure of matter than does the theory of Newton, Dr. Birkhoff says.

New theories of universal gravitation, suggested by modern developments in electromagnetism and modern mathematical formalism, deserve much more serious attention than they have yet received, since they are still in the formative stage, the Harvard mathematician believes. It was Dr. Birkhoff who only a few years ago urged scientists to consider more seriously Einstein's special and general theories of relativity in relation to quantum mechanics.

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NUTRITION

Proteins To Rehabilitate

➤ PROTEINS, the tissue-building foods, must receive first consideration in arranging for the feeding of the half-starved peoples in liberated but looted countries, as the Nazis are thrown out, Prof. Paul R. Cannon of the University of Chicago emphasized in an

address before a Washington meeting of the Food Forum.

Giving hungry people what have been lightly called "energy foods" isn't enough, Prof. Cannon insisted. Though the cry may be for bread, bread alone will not save the starving. And vitamins,