

PHYSICS

New Theory Would Explain Cosmos' Unexpected Ways

A NEW theory which may explain why the physical world sometimes behaves unexpectedly has been outlined by Prof. G. N. Lewis of the University of California. The new system is called generalized thermodynamics.

The science of thermodynamics, which has been so powerful in explaining large classes of physical phenomena, is inadequate in that it does not include those fluctuations from the condition of balance that actually occur in the world. Prof. Lewis has attempted to bring the known facts about fluctuations and the general laws of thermodynamics into one scheme.

Prof. Lewis is well known as one of the most important thinkers on the fundamentals of science, and though it is impossible at present to say what value

the new theory has, scientists will study with interest this latest contribution to a basic question.

Thermodynamics is the science of the broad relations between physical quantities which does not require any special knowledge as to how substances are made up of atoms.

First Valid Statement

The second law of thermodynamics, which tells us that the world is becoming more and more mixed up as time goes on, has been given a new formulation by Prof. Lewis in his paper. He claims that his is the first really valid statement of the law that will stand examination in the light of unexpected happenings which sometimes appear. Those unforeseen fluctuations, though

regular to a certain degree, are nevertheless at variance with the regularities of thermodynamics.

Thermodynamics tells us that a system of physical bodies isolated from others will steadily change towards a unique condition of balance or equilibrium. In point of fact the final condition is one in which the balance oscillates between states near the true balance. These fluctuations from the theoretical balance are such that ordinary thermodynamics cannot inform us of them. Some time ago Prof. Albert Einstein combined the first approximation given by thermodynamics with the Boltzman probability theorem and thus obtained a first solution of the problem.

Prof. Lewis has now carried the question a step further.

He expresses the crucial point of his new discovery as follows: "All the laws of thermodynamics and of fluctuations may be shown to follow from a single cardinal postulate, which is essentially the following: If a given amount of some quantity such as energy or any form of matter is allowed to distribute itself between two systems, so that by one observation we find a certain fraction of the total amount in the first system, and again, after a long time by a second observation we find a slightly different fraction, and so on until the statistical rules governing the observations have been ascertained—then these rules are independent of the mode of communication between the two systems."

Science News Letter, October 31, 1931

PHYSIOLOGY

Insects Better Than Rats For Use in Vitamin Tests

INSECTS are better subjects for use in vitamin tests than are the conventional white rats and other larger laboratory animals. This is the claim of Dr. M. D. Sweetman and Prof. L. S. Palmer of the University of Minnesota, who have been trying out various foods on the larvae of a species of flour beetle.

They gauge the insects' reaction to a given diet by the time elapsing between their emergence from the egg and the end-point of larva-hood, when they become chrysalis or pupae. Besides the obvious advantages the insects offer, in economy of space and rapidity of multiplication, they are also far more sensitive in their reactions to low concentrations of certain vitamins, the two Minnesota scientists state.

Science News Letter, October 31, 1931

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