

Miscellany

Research Notes

The virtual energy level of the deuteron (the singlet state) has in the past been determined experimentally even though its very existence would seem unlikely in view of the negative binding energy involved. Theoretically a puzzle, the virtual level has been defined both in terms of scattering theory and of the theory of nuclear resonance levels. A "simple connection" has now been derived between these somewhat different definitions by S. T. Ma of the Canadian National Research Council, who discusses the virtual energy level in an article appearing in the most recent issue of *Reviews of Modern Physics* (October 1953).

Another new meson has turned up, according to a report in the January 1 *Physical Review* by a group at the University of Rochester. In scanning a series of emulsions exposed at 102 000 feet during an ONR balloon flight, a track was observed that stopped in the emulsion with a single positive pi-meson track emerging from its end. Mass measurements on the primary gave a mass of about 950 electron masses and it is suggested that the event represents the alternate decay mode of a positive tau meson, which ordinarily breaks up into three pi mesons. In this case the single pi track was taken to mean that two neutral pi mesons were also emitted, since the energy of the emitted charged pi was such as to rule out the possibility of the primary having been either a kappa or a chi meson.

The problem of adequately illuminating museum specimens while avoiding damage from the radiant energy has been considered by Deane B. Judd of the National Bureau of Standards. Ordinary incandescent lamps do no harm but give poor illumination and color rendition; fluorescent lamps produce a high light intensity and "color rendition approaching that of natural daylight", but the ultraviolet radiation they emit is harmful to paper, textiles, and pigments. Comparative studies of the zenith sky, the sun, several types of fluorescent lamps, and the incandescent lamp alone and in combination with filters showed that the most effective artificial illumination with negligible radiation hazard could be obtained with cool-white fluorescent tubes in combination with filters such as Greenish Nultra.

Vision and hearing appear to have many similarities, according to a paper given by S. Smith Stevens of Harvard at the Fall meeting of the National Academy of Sciences. He studied responses to light and sound as a function of their intensity, and finds that "to a crude

first approximation, brightness and loudness are proportional to the cube root of the stimulating energy". Further, if visual and auditory responses are both plotted on a decibel scale with the zero point representing the lower limits of sight and hearing, the most satisfactory energy level in each case turns out to be about 80 decibels. Discomfort results from more than 120 decibels of either sound or light energy. Professor Stevens does not attempt to predict whether these similarities will turn out to be merely coincidental or to have some basic physiological significance.

Tritium in the atmosphere has been measured in both molecular hydrogen from the air and in rain water, with the result that there seems to be about a thousand times more tritium in the H_2 of the atmosphere than in the H_2O . Scientists at Temple and Columbia Universities collaborated in this work, and their report in the January 1 *Physical Review* expresses the belief "that this is the only case where the isotopic ratios vary in nature by such a large extent". The tritium is produced by cosmic-ray interaction with air nuclei, and an explanation for the greater proportion of HT than HOT is presented, based on the slow rate of tritium exchange between molecular hydrogen and water in the upper atmosphere.

Education

A bill to authorize the establishment of a permanent nine-member National Advisory Committee on Education in the Department of Health, Education, and Welfare has been introduced by Senator Alexander Smith of New Jersey in response to recommendations regarding education made by the President in his State of the Union message in January. The bill (S. 2724) has been referred to the Committee on Labor and Public Welfare of the Senate. A companion measure, introduced at the same time, would provide funds for the organization of state and national conferences on education.

The Pupin Lectures for 1954 have been announced by Columbia University as part of the observance of the 200th anniversary of the founding of the university. The first talk was held February 19, with H. C. Urey speaking on "Chemical Evidence on the Formation of the Solar System". Future lectures in this series are as follows: March 19, I. I. Rabi on "Molecular and Atomic Beams"; April 2, W. Pauli on "The Connections of Time and Charge Reversal with Statistics"; May 14, H. A. Bethe on "Scattering of pi-Mesons by Nucleons"; October 1, J. Schwinger on "Quantum Field Theory"; November 19, P. A. M. Dirac on "Some Aspects of Quantum Electrodynamics"; and December 10, J. R. Oppenheimer on "Some Outstanding Problems in Theoretical Physics". These lectures will be given in Room 301 of the Pupin Physics Laboratories at Columbia at 5 PM on the dates listed (which are Fridays).

A short course on high temperature properties of materials will be held at The Pennsylvania State University June 21-25, inclusive. Following this course, one on the mechanics of creep will be conducted from