

fueled airplane, etc. will be calculated to within a factor of two or so. Back-of-the-envelope sophomore physics is utilized in attempting to answer the questions.

1D. Hafemeister, Am. J. Phys. 41, 1191 (1973).

2D. Hafemeister, Am. J. Phys. 42, 625 (1974).

JJ 3 Cronback's Aptitude Treatment Interaction (ATI) model is based on the assumption that the interaction between learner's aptitude and classroom treatment can affect his performance. Classroom teaching can become much more effective if individual differences in student's ability and learning style are recognized. We have taught non-calculus Physics course to sophomore students at Virginia Tech using Cronback's approach. Students were given pre-test and post tests for measuring their aptitude, ability and individual differences. The course was taught suitable to each student's pace of learning. We will present preliminary results on student's achievement, their change of attitude toward Physics and the effectiveness of our method of teaching.

JJ 4 On "Asymptotic Freedom", "Charmed Colored Quarks" and Other Recent Fads in High Energy Theory - A Fable. R. J. YAES, Memorial U., St. John's, Nfld., Canada.--Once upon a time, the people in a certain village discovered that a fox was stealing their chickens. They decided that they must go into the forest, beat the bush and drive the fox into the open. The next day, they all gathered around a bush where they thought the fox might be hiding and began to beat it. Because there were so many of them crowded together in exactly the same place, doing exactly the same thing at exactly the same time, some even wound up inadvertently beating each other and several villagers were seriously injured. When the fox failed to emerge, they all moved on to another bush and did the same thing again. Surprisingly enough, after several years of this, they still hadn't found the fox. The moral of the story can be left as an exercise for the reader.

JJ 5 A Comparison of Two Models for The Time Variation of Radionuclides in Oysters Aquacultured in the Effluent at Maine Yankee Nuclear Power Reactor.\* C. T. HESS, C. W. SMITH and A. H. PRICE. University of Maine-- Comparison is made between a pulse driven relaxator model<sup>1</sup> and the concentration factor model<sup>2</sup> for the time variation of radionuclides in a biological system. These models will be compared to the results of an 18 month longitudinal field study of the uptake of reactor associated gamma-ray emitting radionuclides in aquacultured oysters (*C. virginica*). Although the concentration factor model is adequate for simple laboratory studies, we find the pulse driven relaxator model necessary for field studies. Data and calculations for <sup>58</sup>Co and <sup>54</sup>Mn will be shown.

\* Work supported by the National Oceanographic and Atmospheric Administration.

1 C. T. Hess and C. W. Smith, Bull. Am. Phys. Soc. Series 2, Volume 19, P. 781 (1974).

2 A. H. Seymour, Radiation in the Marine Environment National Academy of Sciences (1971) 163.

JJ 6 Subquantum Structure of the Brain. JOSEPH G. BARRÉ DO, OSIG.--The confirmation of the subquantum Eq.  $I = t^{-3/2}$  by: (a) beam-foil-spectroscopy (Phys. L. 45A, 13). (b) Hodgkin, Huxley and Katz's axon potentials. (c) J particles (Bull. Am. Phys. Soc. 19, 481 and April 1975) also confirms: (1) neither the brain subquantum structure, nor sensations, feedback or any cybernetic concept (Wiener Cybernetics) can be explained or even classified (far less predicted) using timeless-jumps (quanta). Neither using von Neumann mathematical models. Any of these phenomena is a many-body problem and no mathematical concept can exactly solve any many-body

problem, as triondynamics confirms. By "many" the mathematician means anything bigger than 2. Yet, many in Nature means all the charges,  $N$ , of the Universe interacting simultaneously. The mathematician's role is to find logical relations between axioms, not to show that the axioms are true. (2) The fundamental equations of Newton and Coulomb forces at a distance become oversimplifications of the trion generalized concept of charge, because mass is the rotating energy of the trion, necessary to avoid the recombination of charges. The trion gives a subquantum explanation of the mass concept and the quantum, because the quantum is produced by the recombination of charges with the trion.

JJ 7 Mössbauer Studies of Pb<sup>129</sup>I<sub>2</sub>. Y. W. CHOW, M. FUCHS, E. LOUIS, and AMBUJ MUKERJI, Lehman Coll., CUNY.--The Mössbauer hyperfine spectrum of <sup>129</sup>I in the form of PbI<sub>2</sub> has been measured as a function of temperature. Depending on the process of preparation PbI<sub>2</sub> crystal is obtained in two allotropic forms. From our experimental data the values of recoilless fraction, Debye temperature, isomer shift, and EFG in PbI<sub>2</sub> crystals have been estimated. The relationship between the temperature dependence of the recoilless fraction and the type of chemical binding will be discussed. Difference in electronic properties of the two forms of PbI<sub>2</sub> will be discussed in terms of the isomer shift, and the quadrupole splitting as observed in our Mössbauer measurements.

JJ 8 Multicomponent Flows in a Model Membrane. M. HOWARD LEE, Univ. of Georgia. Flows of molecules in a model membrane under the influence of concentration gradients are considered within the framework of classical theories. A lattice model is constructed in which the binding sites represent potential minima and the flows result from molecules making transitions between binding sites. Expressions for two-component fluxes are derived from certain descriptions for the transition mechanisms. Where the molecular movement is given the crudest description, permeabilities are identical for both components and there is no flux coupling. Where the movement is given some finer detail, permeabilities show flux coupling. Our result applies to a combination of tracer and abundant isotope flows. Also considered are binary fluxes whose transport mechanism is further controlled cooperatively as in allosteric cooperativity. Whether the cooperative control is short or long-ranged, permeabilities and flux coupling show a considerable departure from those of flows without cooperative control. Numerical evidence suggests that the permeability and flux coupling may have discontinuous behavior at a certain critical strength.

JJ 9 The Ecophysical Role of Life Is Not Unique. J. P. WESLEY, 1 Berlin 61, Blücherstr. 32 -- Contrary to common belief, life does not maintain order in a chaotic environment. Entropy reduction by life is not unique; the entropy of the entire universe (excepting the cosmic thermal background) is on-the-average decreasing with time. Low entropic stars, planets, etc. evolve from high entropic gas clouds. The likelihood of life occurring and the carrying capacity of an environment may be measured using the rate of thermodynamic ordering in the environment. The existence of life, thus, apparently depends upon the expansion of the universe, assuming the expansion provides the necessary sink for all of the unwanted high entropic photons generated in the universe.

\* Wesley, ECOPHYSICS (Charles C. Thomas, Springfield, Ill., 1974) pp. 189-194.