

BOOK REVIEWS

Newton versus Einstein: How Matter Interacts With Matter by Peter Graneau & Neal Graneau. New York: Hearthstone (Carlton Press, 11 West 32 Street, NY 10001), 1993, 219 pp., \$14.95 (+ \$1.50 postage & handling). ISBN 0- 8062-4514-X.

How does matter interact? This is the key question, the heart of the book.

According to present theories that have their roots in the 19th century, matter interacts by means of mysterious "fields" of various kinds, fields that promulgate with the velocity of light. On the other hand, some new material suggests that some communications occur "instantaneously." These alternatives are called respectively "Einsteinian" (because passage of information at the speed of light is the basis of the special theory of relativity) and "Newtonian" (because Newton was loath to assert that there were "fields" that extended between particles and thus implied "action at a distance").

These are some of the concepts confronted in this book, which in some 200 pages addresses fundamental dilemmas in present-day physics.

Inertia is a much-discussed topic. The Graneaus give a beautiful account in which they relate theories of inertia back to those of Mach at the beginning of this century. They view inertia as the result of the gravitational interaction of all particles in the universe on the body in question, instantaneous transfer making even distant galaxies a part of this interaction.

The authors feel, correctly, that there is a resemblance between the Academies of Science at present and the influence of the Church at the time of Galileo. There is effective censorship of ideas inconsistent with the 1926 Quantum Theory or which play down the significance of Relativity. If new observations do not agree with the present physics, the investigator is accused of fraud or sloppy science (cf. cold fusion, now backed by 500 positive papers but still unfunded, and indeed ridiculed, in the U.S.A.).

There is, luckily, a small band of physicists who express their disagreement with the present paradigm and among them are the Graneaus, Pappas, Assis, Viger, Wesley and Monti. These physicists challenge the present world-view:

1. Some communication (and interaction) is super-luminal.
2. Inertia is owing to gravitic interactions between all bodies of the universe, acting instantaneously upon the body concerned.
3. There are basic contradictions within present electrodynamics. The experiments that the Graneaus describe here, simple and basic, involve for example the time course of electromagnetic induction which occurs just after a current has been switched on.

4. Some Quantum concepts are incomplete. For example, the Graneaus quote the Aharanov-&-Bohm thought-experiment of 1960 which was really an echo of the E-P-R suggestion of 1935. As a follow-up, Moehlenstadt and Bayh in 1962 measured the time-dependence of the effect of a magnetic field on a stream of electrons and found that the electrons interacted with the alleged field before — calculated conventionally — it could reach them. Non-locality was evidenced here as well as in the work of Allain Aspect in his verification of Bell's theorem.

This book takes the grand view of physics and looks around over times great compared with those normally considered. Thus Newton's (non-local) theory of gravitation gave rise to an understanding of the Solar System and was the basis for the Industrial Revolution in the pre-electromagnetic world. Faraday and Maxwell were the origin of the part electromagnetic communication plays in our present world. Then in the 1920s there was again a tremendous burst of progress, Quantum Theory and Relativity.

But now, the authors believe, the dust has settled and there are too many aspects of present physics that seem inconsistent with observation. The time has come for a Great Re-Think. There is a telling quotation from Einstein in a letter written towards the end of his life to his old friend Besso. It states that field concepts may be entirely wrong. If they are, Einstein says, then all his endeavors and the rest of modern physics are up for a re-forming.

This little book is the expression of workers who really do try to penetrate into the darkness, instead of singing the old song in a new style. But scientists like the Graneaus will never win a Nobel Prize. They ask too many disturbing questions to obtain the support of the establishment scientists who decide who gets the Prize.

A wonderful clubby feeling pervades the book; there are several sketches in it of personalities and historical happenings in physics over the last 400 years. The editing could have been improved: there is reference to some older electromagnetic laws with which many of us are not familiar; the various terms in respect to far action, non-locality, etc., are known only to a small number of physicists, and should be explained and defined. Let us hope that the book will be reprinted with the minor clarification it needs. Its seed may fall upon dry ground in academia, but outside the universities, it may bear good fruit, perhaps even an entirely new and different orchard. Let's hope it won't come too late.

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