

The Ephemeris

Focus and books

Book Review

Erich R. Bagge, "World and Antiworld as Physical Reality." Haag and Herchen, Frankfurt am Main, 1994. Clothback, 277 pp.

Prof. Dr. Erich Bagge has produced this clothback in support of his theory of beta decay in which the neutrino plays no role. There is simply no neutrino, and no need for an industry founded on the search for one. In consequence, his ideas have been censored by the academic journals in much the same way as van Gogh would have been denied access to the Salon. There are twelve chapters in all, revealing a firm grasp of the concepts in this area of physics, and more importantly, an interesting mind at work. In the *fin de siècle* this is a somewhat dangerous attribute when a large fraction of the world's output of gallium has been officially commandeered in an effort to trap the elusive particle.

The chapters cover positive and negative energies in physics; theory of holes and pair production; pair production in the Dirac world; the new theory of pair production; beta decay in world and anti-world; the inertia of masses and antiworld; polarodynamics and electrodynamics; relativistic polarodynamics; quantum polarodynamics; electron at rest in polarodynamics; protons and muons as shell particles and elementary spheroidal particles. The author and his group have also acquired experimental data in support of Bagge's theory. These experiments are described on the back cover of the book—pair production by gamma quanta in gold foil in a helium filled cloud chamber operated in a 703 gauss magnetic field. The energy sums of the electron-positron pairs have shown energy defects which are interpreted in terms of the Dirac sea.

All perfectly reasonable and well executed. However, the result of this work is that the neutrino is discarded as unnecessary. The response of the usual journals, according to Dr. Bagge's own account, has been to discard HIM as unnecessary—so this book has been produced to make these interesting data available to reasonable investigators in physics. The deficit of solar neutrinos as reported in the well known work of Davis is re-analyzed carefully in pp. 52 ff., and 70 measurement sequences reproduced in Figure 3.1. Dr. Bagge reasonably points out that the lower end of the very large uncertainty bars in this figure have all been truncated at zero on the ordinate, giving the arbitrary impression that there there is a non-zero production of solar neutrino units, *i.e.* 1.77 plus or minus 0.26. On this basis he argues that this experiment has not demonstrated the arrival of neutrinos from the sun.

This, together with a careful reanalysis of the Bethe-Heitler theory and of its purported experimental corroboration around 1937, is made the basis for an approach to beta decay based on the Dirac sea. The volume is then a logical development of the Dirac theory, which is roughly cotemporaneous with the proposal of the neutrino by Pauli (1930) and later by Fermi. Replacing the neutrino in contemporary particle theory would mean the dismantling of an industry, even though the actual evidence for this "massless" particle is flimsy, and according to Dr. Bagge, has been subjected to what is known among undergraduate chemists as cookery. Ridiculously, in the age of accelerating ozone destruction, 60% of the world's gallium is being used to look for a particle that can comfortably be replaced by the Dirac sea. Whither humanity?

Dr. Bagge then makes a courageous attempt to develop Dirac sea theory in other contexts, including that of electrodynamics, where recent work has produced the F-number of the photon, meaning that there is an anti-photon that could also probably be described best by the Dirac sea theory. The latter appears in respectable books such as Ryder's successful *Quantum Field Theory*, and indeed, why not? It would be wildly over-optimistic to claim that Dr. Bagge has succeeded in replacing all the work in physics involving the neutrino, and he does not seem to have tackled parity violation, but the important thing is that he has made an entirely reasonable effort at showing that this particle may not exist at all, and may be a mathematical or empirical contrivance, in much the same way as renormalization is a clever bit of cookery in QED. Undergraduates know that cooking means drawing the line first and adding the data later, leaving us no wiser than before.

There are some minor defects in grammar, and some misprints, the layout is not always completely under control, but these are trivia compared with the message that this book puts across yet again: the establishment will censor the individuals with good ideas if those ideas do not fit the pudding bowl. We all know what happened to Galileo, some of us know that Bruno was burnt in 1600 by Calvin, and so on *ad nauseam*. In our *fin de siècle*, minds are closed as never before in the twentieth century—we are no wiser than before.

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The Bookshelf

New Publications on Physics and Astronomy

A.G. Shlenov, Mikromir Vselennaya Zhizn: Populyarnaya Seriya,
Saint Petersburg, 1995 (In Russian, 71 pages, paperback)

In Memoriam Nathan Rosen

Nathan Rosen, Distinguished Professor in the Physics Department of Israel's Institute of Technology (IIT – Technion Haifa) has departed this world. Unlike Einstein, he was unknown to the general public, even to the public of such a small country as Israel. As far as the typical physicist is concerned, his name is mnemotechnically reduced to the “R” of the “EPR paradox”. As a matter of fact, the driving force behind the papers “Can Quantum Mechanical Description of Physical Reality be Considered Complete?” and “The Particle Problem in the General Theory of Relativity”—both published in 1935—was the 26 year-old Rosen, who had received his Sc. D. Just three years earlier, after graduating as a chemical engineer from MIT. His third (and last) paper with Einstein, “On Gravitational Waves”, was the work of a mature physicist, rather than simply “Einstein’s assistant”. Indeed, as early as 1936, he left Princeton for Kiev (!) and embarked on his own course. This course was characterized by a fascination with “general covariance”, receptivity to relevant experimental results, and by outstanding tenacity. A truly honest man, he found it impossible to ignore the baffling results of Prof. Dayton C. Miller, who reported measurements of an “aether wind” of about 10 km/sec. At the Case School of Applied Science at Cleveland, Miller continued the “aether drift” experiments of Michelson and Morley for years and, using extreme care and refinement, finally came to the conclusion that motion through aether could really be measured. Rosen’s “bi-metric theory of gravitation”—started in January 1940—was able: (1) to account for the results of Miller; (2) to avoid “black hole” and “Big Bang” type singularities; and (3) to define an energy-momentum tensor (rather than a *pseudo-tensor*, as in Einstein’s theory) obeying the accepted conservation law. Nathan Rosen pursued his “bi-metric theory” until his last days. He found followers in Russia (Petrov, Petrova, Fock, Papapetrou, Logunov, Israelit), but no prominent

follower in the West. It is symptomatic that Amiram Ron, the Dean of the physics department in 1979 (when both Einstein’s centenary and Nathan Rosen’s 70th birthday were celebrated at the Technion) was eager to learn about Rosen’s bi-metric theory one day before fulfilling his duty (a five-minute speech) as dean.

I enjoyed Prof. Rosen’s graduate courses on gravity and fundamental quantum mechanics in the intimacy of an audience of at most a half-dozen graduate students. Later, as a young lecturer on classical and (“special”) relativistic mechanics, I started to re-think fundamental physics for myself and was fortunate to have the opportunity to accompany Nathan Rosen on his long walks through the pine forests of Mount Carmel. Rosen the man was always modest, quiet, receptive, scientifically honest, and, almost imperceptibly, ironical. He never let me feel the gulf which separated him from my old supervisor, Aharon Adolf Hirsch, an experimental physicist-turned electrical engineer from Bulgaria. He listened carefully to my early criticism of “special” relativity and encouraged me in his own serene way to pursue my own thoughts. In this connection, I cannot refrain from citing the following impressive comment made by Maimonides in his “Guide for the perplexed”:

For when something has been demonstrated, the correctness of the matter is not increased, and certainty regarding it is not strengthened by the consensus of all men of knowledge with regard to it. Nor could its correctness be diminished and certainty regarding it be weakened even if all people on earth disagreed with it.

This quote was brought to my attention by Prof. Mendel Sachs, a much older and closer friend and follower of Nathan Rosen.

George Galeczki

