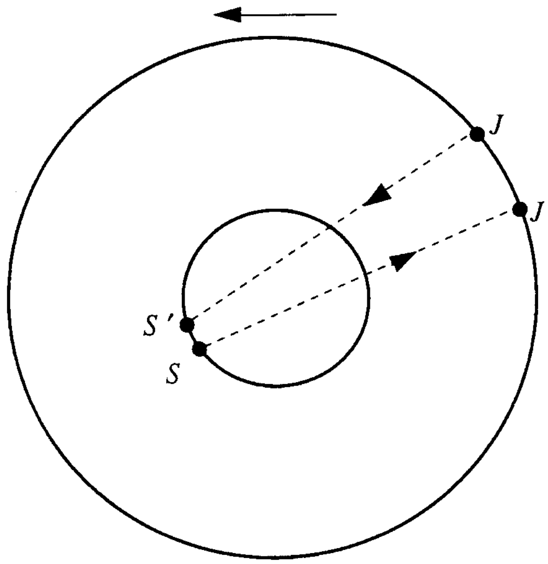

Fig. 1. Orbit stability and finite propagation speeds.

ence frame of S, one must consider retardation effects, and in this case there is no couple but linear momentum is not conserved. This is due to the fact that the force of S on J is not collinear with the force of J on S.

In Eddington's book [2], the very next sentence after Van Flandern's quote states that "The argument is fallacious, because ..." and there follows some discussion and a reference to Note 6 in Eddington's Appendix. While Eddington's comments as to why the argument is fallacious are cursory at best, he does speak of the potential of Liénard and Wiechert. He *implies* that if one first computes the retarded potentials of the two masses, one obtains the gravitational equivalent of the Liénard and Wiechert potentials and the latter are well known to yield, for a charge q with a uniform velocity v, electric and magnetic fields at an observation point O *that point back to the present position, not the retarded position.* As a result, Eddington concludes that there is no torque.

The no-torque result can be obtained from the Lorentz transformations when they are applied directly to the static Newtonian gravitational force. We will do the equivalent computation below in terms of the gravitational version of the Liénard and Wiechert potentials. Consider also the Trouton and Noble [3] experiment where two charges are held at the opposite ends of a horizontal rod. Before special relativity, because of the Earth's rotation and revolution about the sun, it was believed that the axis of the rod *will inevitably be inclined with respect to its direction of motion through the ether.* Thus the two charges would produce currents that repel (attract) each other if the charges are opposite (alike), and consequently there will be a torque on the rod. Special relativity, where there is no ether, predicts no torque and none is observed in the charges' rest frame.

The Van Flandern argument predicts the wrong result when applied to Trouton and Noble type experiments: For the sake of simplicity, consider two opposite charges such that the line connecting them is instantaneously perpendicular to the velocity, v, of an observer moving with respect to the charges. One would predict, using Van Flandern's argument, electric fields pointing back to retarded positions of the charges. If F is the force along the line connecting the charges in their rest frame, there would be a force Fv/c on each charge opposing v. This force cannot be canceled by the v^2/c^2 magnetic force between the charges.