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will move on geodesics in some 'dynamical' metric. Whitehead's theory has no field equations and the metric is determined by prescription in terms of the source distribution of charge and mass. It is essentially an action at a distance theory.

Coleman's theory does have field equations but has not specified how the source distribution enters. Presumably, it is to be specified in terms of a scalar constructed from the stress-energy tensor after the manner of Nordström (1913).

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Concerning Rao's rule

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Abstract. It is shown in a short note, that the expression derived by Mathur, Gupta and Sinha in their article entitled: 'Theoretical derivation of Wada's and Rao's relations', has been known for a long time. A short review of literature enclosed, makes possible the orientation in some problems related to the derivation and application of Kuczera's equation.

An article of Mathur *et al* (1971) has appeared as an attempt at a theoretical explanation of Rao's and Wada's relations. The authors arrived at the expression

$$2\alpha_c = -\{K(\nu+2)-2\}\alpha_v \tag{1}$$

in which

$$\alpha_c = \frac{1}{c}\frac{\mathrm{d}c}{\mathrm{d}T} \qquad \alpha_v = \frac{1}{v}\frac{\mathrm{d}v}{\mathrm{d}T} \qquad K \simeq 1.$$

c is a sound velocity and ν is an exponent in the potential of the molecular interaction

$$\varphi = -\alpha v^{-\mu} + \beta v^{-\nu}.$$

Equation (1) makes it possible to calculate the exponent ν in the Lennard–Jones formula. I should like to point out, that this relation has been known for a long time and in general it is known as Kuczera's formula (Kuczera 1957, 1958 and Kuczera *et al* 1959). Because of the great usefulness of this formula it is discussed in some monographs and textbooks (see Kudriawcew 1961, Schaaffs 1963 and Trendelenburg 1961). Kuczera *et al* (1959) also generalize the formula to mixtures of fluids.

In the derivation of relation (1) it is necessary to assume that the reason for the variation of the sound velocity with temperature, at a constant pressure, is the thermal expansion. Among other things Kuczera (1959) showed that this formula is valid when a longer ranged molecular interaction is considered and that thermal expansion is indeed a decisive factor in the thermal dependence of the sound velocity, but it is not the only one (Kuczera 1971).

In various problems of the theory of liquids, the exponent ν, averaged for all liquids, is often employed, but in a considerable number of cases the knowledge of individual values of ν for each liquid is necessary. For example Soczkiewicz (1971) and Wozniczak (1971) showed that the relation between ultrasonic velocity and surface tension, as well as between ultrasonic velocity and heat of vaporization of liquids gives much better agreement with experiment if individual exponents ν for each liquid are introduced, which are calculated from Kuczera's formula, rather than any other.

In the present state of knowledge, therefore, the derivation of Mathur, Gupta and Sinha comes several years too late. It is clear, that in view of the avalanche of ever increasing scientific information it must occur, that various authors in different ways come to similar results and that repetition of these is often inevitable.

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