The "effective resistivities" shown in Fig. 3 have been calculated on the arbitrary assumptions that $z$ is 2 for Zn and 4 for Pb, that $q^*/q = 1$ (reasonable for self-transport), and that free electron approximation applies. The physical meaning of $q^*$ is with these simplifications naturally somewhat uncertain, but the object of the calculations leading to Fig. 3 has been to shed light on the question whether or not in an equation of the form

$$z^* e = (q^* - K/\bar{\rho}),$$

the factor $K$ can be considered to be a constant, which is of importance e.g. if the true charge of an alloying element is to be determined by electromigration (plotting $z^* e$ vs. $\bar{\rho}^{-1}$ gives $q^*$ as intercept on $z^* e$ axis). The present results as well as those of practically all other non-isothermal measurements (see summary, ref. 5) suggest that $K$ diminishes as temperature rises. The sole exception is the investigation on In where $K$ was constant. The results of ref. 6, on the other hand, show an increase of $K$ with temperature, although the wide limits of error allow the possibility of constancy or a slow decrease. Recent exact isothermal measurements on Au gave constant $K$. The possibility cannot therefore be excluded that, while the reproducibility of the present result appears considerably superior to that of isothermal work on Zn and Pb, the observed decrease in $K$ may be due to an inherent error liable to affect the non-isothermal method as such. No definite conclusions have been drawn as yet concerning the possible source of such an error. However, the recent discovery of microvoids in the cathode portions of In and Ag electromigration specimens may have a bearing on the problem. For In, a correction was actually introduced to cover this effect. In the present work, Zn exhibited a trace of microvoids, but not sufficiently clearly to warrant a safe correction. In Pb, metallographic examination was too difficult to give a reliable indication.

By conducting similar experiments using AC, a search was made for a thermotransport effect in Zn and Pb; from the observed marker motion, the Soret heats of transport $Q^*$ were calculated (see ref. 11). The results were $Q_{Zn}^* = (-0.2 \pm 1.5)$ kcal/mole, and $Q_{Pb}^* = (+2.1 \pm 4.0)$ kcal/mole. Thus no certain indication of thermotransport could be obtained in these metals. In Zn the small value of $Q^*$ agrees with earlier measurements 12. In Pb (where no earlier results are available) an accuracy limiting factor was that a substantial part of the AC effect may have been masked by the sagging of the specimen and by creep (see ref. 5).

This work was supported by the Swedish Technical Research Council. We acknowledge the able assistance of Mr. H. Olsson.