formation from the practical standpoint than is contained in the original surface action currents from which it is derived. Furthermore, different frames yield different derivations. The difficulties in relation to the acceptance of a standard frame still remain, especially when one recognizes that Vanremoortere (1956) has shown that decrement of potentials in a homogeneous cylindrical medium is not completely understood. Vector derivation depends on theory which is as yet deficient mathematically for man. As stated by the author, the varied resistances in the body have been recognized for a long time, and have been considered especially by Kaufman and Johnston since 1943. In fact, the conclusion drawn by them is one of the points indicating that the three-dimensional display of Trethewie should be satisfactory in practice.

The fact remains that should vector derivation be possible with complete accuracy, which, even with Schmitt's brilliant researches, is still not possible, no further information can be derived from such vectors than is contained in the original two-dimensional tracings. Furthermore, reading of such vectors is difficult, even though this has improved with projection to three flat planes.

It is desired to stress that vectors cannot demonstrate any further practical information than can be obtained from surface tracings, and this includes the more recent evidence on heart block and infarction. The dipole concept actually was not argued but the electrical source at the heart is exceedingly complicated, even if it is regarded as an almost infinite number of dipoles appearing and reappearing in specialized sequences and directions, as was stressed in a recent publication by Trethewie (1958).

R. Douglas Wright, F.R.A.C.P.
Professor of Physiology

Utrecht, Netherlands
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To the Editor:

The annotation "Electrocardiography" by Dr. R. Douglas Wright (*American Heart Journal* 60:154, 1960) might give a wrong idea of the recent situation of ECG and VCG.

The opinion that "such a derivation rests on two false premises" (p. 155) could give the impression that this criticism is meant for VCG in general. As to the first point mentioned, the applicability of the dipole conception, valuable work has been done to verify this assumption. Several lead systems of VCG take into account the effect of the position of the dipole. The effect of the varying specific resistance in the trunk was taken into account many years ago. As a second point, the author states that different lead systems give different results. This fact has not been neglected by investigators in the field of vectorcardiography. Opinions vary between the optimistic view that these differences are of minor importance and the more pessimistic view that there is still essential work to be done on this subject. But certainly most investigators agree that there are reasons to choose one of the systems which have a sound physical basis, in order to avoid too great a divergence between lead systems.

The method of Trethewie, recommended by Dr. Wright, has some advantages over the recording of loops and has been recommended and used by some other authors, too. The records of the three components of the heart vector can comprise just the same information as that found in vector loops with time marks. But this is true only if the phase relation between the components can be derived from the records with sufficient accuracy. It is just one of the advantages of VCG to give a result in which these phase differences are displayed in a way that is adapted to the property of the human brain to recognize a shape. The VCG loops give details of shape on such a great time scale that it is difficult to compete with that in ordinary graphs giving the components of the heart-vector as a function of time.

The field of ECG, including VCG, is too vast to be summarized in a single page. It is certainly an extremely difficult task to give a clear review of the main points of the recent developments in this restricted scope. I fear that the author has not succeeded in doing so.

H. C. Burger, Ph.D.