Spheres cutting 4 given spheres s_1, s_2, s_3, s_4 at given angles φ_1, φ_2, φ_3, φ_4.

H contains the determinant formed by the discriminant of φ, bordered with the coefficients of the planes as a factor. This expression is of the same degree as H, both in $a_{i,k}$ and the coefficients of φ, hence the remaining factor is numerical. By comparing corresponding terms in the two expressions, this is seen to be ± 1. The sign to be prefixed depends upon h in both cases, but the H method has two advantages, viz.:

H is of order $n - 1$; the bordered discriminant is of order $2n$.

H appears in many other connections; the bordered discriminant would have to be calculated for this purpose.

CORNELL UNIVERSITY,
July 19, 1897.

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FLUID MOTION.

Hydrodynamics. BY HORACE LAMB, F. R. S. Cambridge University Press. 1895. 8vo., pp. 604.

The appearance of a new treatise on any branch of higher mathematics rarely calls for anything else than congratulations to the author, and the volume before us is no exception to the rule. The problems of hydrodynamics present so many difficulties and the opportunities for students to obtain a connected view of them are so rare that any additional help is valuable. Professor Lamb, however, has gone much further than merely producing a continuous account of the subject as it stands at the present time. He has given us a treatise which will easily rank first amongst those in the English and perhaps in any language. The only other English treatise of the same scope, that by Basset published in 1888, although an advance on those which had previously appeared, rather suffers by comparison, both in its plan and the manner in which it is carried out.

In looking over the list of authors which Professor Lamb gives in an index, we are struck by the frequency with which four or five names occur, and a closer examination of the references attached to other names reveals the fact that the mathematical development of hydrodynamics has been almost entirely due to these four or five writers. It must be concluded from this, either that some cause has prevented all but a very few mathematicians from seriously