which is seen to follow from Ceva's Theorem on considering the triangle ADE and the point G.

The corresponding theorem *in plano* is :—

If a transversal ABC meets three concurrent lines OA, OB, OC, and A′, B′, C′, are points in these lines such that OA′B′C′ is a parallelogram, then

$$OA'/OA - OB'/OB + OC'/OC = 0;$$

a theorem which is very easily proved.

If we invert the four points A, B, C, D, of the theorem proved above into the points P, Q, R, S, taking O as centre and k as radius of inversion, we have

$$OA.OP = k^2; \therefore OA = k^2/OP.$$

Substituting in the relation

$$OA'/OA - OB'/OB + OC'/OC - OD'/OD = 0,$$

we get $$OA'.OP - OB'.OQ + OC'.OR - OD'.OS = 0.$$

Hence if four points P, Q, R, S, lie on the same sphere with the point O and a plane cuts OP, OQ, OR, OS, in A′, B′, C′, D′, so that A′B′C′D′ is a parallelogram, then the above relation holds.

The condition that the extremities of four vectors lie on a sphere passing through the origin, may be written

$$\frac{a}{\alpha^2}.\alpha + \frac{b}{\beta^2}.\beta + \frac{c}{\gamma^2}.\gamma + \frac{d}{\delta^2}.\delta = 0, \text{ where } a + b + c + d = 0;$$

or, $$p\alpha + q\beta + r\gamma + s\delta = 0, \text{ where } p\alpha^2 + q\beta^2 + c\gamma^2 + d\delta^2 = 0.$$

On the number of elements in space.

By Rev. Norman Fraser, M.A.

On the solution of the equation $x^p - 1 = 0$ (p being a prime number).

By J. Watt Butters.

[At the first meeting of this Session a paper was read on the value of cos $2\pi/17$, which evidently may be made to depend on the

https://doi.org/10.1017/S0013091500030261 Published online by Cambridge University Press