ON THE CORRESPONDENCE BETWEEN SPACE SEXTIC CURVES AND PLANE QUARTICS IN FOUR-SPACE*

BY B. C. WONG

This paper proposes to show by means of an involutorial quartic transformation in space of four dimensions a certain correspondence between certain space sextics and plane quartics. The transformation is effected by four quadric varieties.† To a point is made to correspond the intersection of its polar spaces with respect to the quadric varieties. If a point describes a line, a plane, or a 3-space, the corresponding point describes a quartic curve, a two-dimensional surface of order 6, or a three-dimensional variety of order 4, respectively. The locus of points which transform into lines is the surface J_2^{10} (of dimension 2 and degree 10) and the locus of these lines is J_3^{15} (of dimension 3 and degree 15). The J_3^{15} is the Jacobian of the $|M_3^4|$, images of the S_3 of S_4. The former is the four-fold two-dimensional surface on the latter and the latter is generated by the quadri-secants of the former.

Consider a fixed plane σ_2. It has 10 points P in common with J_2^{10}. The surface Σ_2^6 into which σ_2 transforms is intersected by a 3-space S_3 in a sextic curve Γ_1^6. The quartic variety S_3^4 corresponding to S_3 is met by σ_2 in a quartic γ_1^4 through P. The transform of γ_1^4 is a degenerate curve of the 16th degree in 4-space made up of 10 lines corresponding to the 10 points P and the sextic Γ_1^6 which is in S_3. This sextic Γ_1^6 is said to correspond to the plane quartic γ_1^4.

The 10 points P in σ_2 determine ∞^4 quartics; correspondingly, Σ_2^6 determines with the ∞^4 3-spaces in 4-space ∞^4 sex-

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† N. Alderton, *Involutory quartic transformation in space of four dimensions*, University of California Publications in Mathematics, vol. 1, No. 15, pp. 345-358.