surfaces of order t, the image of C_{2s-1} for a particular surface is a conical curve of order $(2s-1)t$.

In S_r, the image of any point on the base M_{s2} or M_{t2} is a conic. The lines joining points of M to a particular point of f_1 form a conical primal with a point vertex. It is met by the corresponding primal of the second pencil in a manifold $M^{r-2}_{(3s-2)t}$ or $M^{r-2}_{(2s-1)t}$ according as there is contact or not.

UNIVERSITY OF BUFFALO

NOTE ON SOME EQUATIONS WITHOUT AFFECT*

BY SAUNDERS MACLANE

A numerical equation of degree greater than 4 certainly cannot be solved by radicals if it is "without affect"; that is, if its Galois group is the symmetric group. Hence it is of interest to construct explicitly such equations. A number of such constructions have been developed,† many of them intrinsically related to certain prime-ideal decompositions. Hence the Newton polygon construction for prime ideals and the related Eisenstein irreducibility criterion are relevant, and can be used systematically to give new proofs for several known constructions (Theorem 2) and for some new equations without affect (Theorems 1 and 2 and generalizations). The advantages lie in the uniform procedure and in the ease of the explicit construction of Theorem 1.

THEOREM 1. *Let p, q, and r be rational primes and construct*

$$f(x) = x^n + a_1x^{n-1} + a_2x^{n-2} + \cdots + a_n, \qquad (n \geqq 4), \tag{1}$$

with rational integral coefficients a_i such that: (I) *each a_i is divisible by r, but a_n is not divisible by r^2;* (II) *each a_i is divisible by q, and a_n but not a_{n-1} is divisible by q^2;* (III) *the highest power e_i such that a_i is divisible by p^{e_i} satisfies*

$$e_1 \geqq 1, \qquad e_2 = 1, \qquad e_3 \geqq 2, \qquad e_i - e_{i-1} > e_{i-1} - e_{i-2}, \tag{2}$$

* Presented to the Society, April 10, 1936, and subsequently extended.

† Ph. Furtwängler, *Ueber Kriterien für irreduzible und für primitive Gleichungen und über die Aufstellung affektfreier Gleichungen*, Mathematische Annalen, vol. 85 (1922), pp. 34–40.