ABSTRACTS OF PAPERS

SUBMITTED FOR PRESENTATION TO THE SOCIETY

The following papers have been submitted to the Secretary and the Associate Secretaries of the Society for presentation at meetings of the Society. They are numbered serially throughout this volume. Cross-references to them in the reports of the meetings will give the number of this volume, the number of this issue, and the serial number of the abstract.

1. Professor D. N. Lehmer: *Bimagic squares.*

A bimagic square is one that is magic also in the squares of the elements. The author has proved the impossibility of bimagic squares of orders 3, 4, 5 and 6; and has also set up drastic restrictions on those of higher orders. (Received November 26, 1934.)

2. Dr. D. C. Duncan: *Completely symmetric elliptic self-dual curves of order $4k$.*

The well known formulas of Plücker are merely *necessary* conditions on the class, order, and number of singular elements of a plane algebraic curve, by no means insuring the existence of a locus, real or imaginary, having a designated set of consistent Plücker-elements. The present paper is a continuation of those appearing in this Bulletin (August, October, 1933; April, 1934), which establish existence of certain real self-dual loci of $p=0$, 1, whose singular elements are all real and distinct; such loci are impossible for $p>1$, since $k=n+2p-2$. The curves considered in this paper are very approximately realized by drawing $4k$ secant lines (omitting chords) through alternate points of $4k(k<1)$ points equally spaced about the unit circle. The equation in polar coordinates is $A\rho^{4k}\sin^2 2k\theta-(\rho^2-1)^3\prod_{i=1}^{2k-4}(\rho^2-a_i^2)^2=0$, in which the A, a_i, are the *unique* set of constants which cause the equation $A\rho^{4k}-(\rho^2-1)^3\cdot\prod_{i=1}^{2k-4}(\rho^2-a_i^2)^2=0$ to have $2k-4$ double roots. These loci are invariant under $8k$ collineations and $8k$ correlations, of which $4k+2$ are polarities. (Received November 3, 1934.)

3. Dr. D. C. Duncan: *The completely symmetric self-dual curve of order eight.*

In polar coordinates this locus has the equation $27\rho^8\sin^2 4\theta-256(\rho^2-1)^3=0$; its 8 cusps are equally spaced on the circle $\rho=1$, 8 crunodes equally spaced on $\rho=2$, 4 biflecnodes at infinity. The locus is autopolar by 8 rectangular hyperbolas and the 2 circles $\rho^2\pm(4/9)3^{1/2}=0$, which fact furnishes ready means for obtaining the bitangents and foci. The 64 foci lie by 8's on the 4 (double) cuspidal tangents $\theta=0$, $\pm\pi/4$, $+\pi/2$, corresponding to the 8 eighth roots of $(4/3)^8(1/12)$, and by 8's on the lines $\theta=\pm\pi/8$, $\pm 3\pi/8$, at distances from the