

gathers in its meshes all types of subgroups and lets none escape. My list of groups should be verified or corrected by the application of Lie's methods.

I append here a list of the group types discussed in the foregoing pages with a brief characterization of each.

- (1) The six-parameter group  $G_6$  of all circular transformations.
- (2) The four-parameter group  $G_4$  leaving a single point invariant.
- (3) The two-parameter group  $G_2$  of type  $T$  leaving a pair of points invariant.
- (4) The two-parameter group  $G_2'$  of type  $T'$  leaving a single point invariant.
- (5) The one-parameter group  $G_{1c}$  of type  $T$  and constant  $c$  in  $k = e^{(c+i)\theta}$  leaving two points invariant. (a) The one-parameter group of elliptic transformations for which  $c = 0$ . (b) The one-parameter group of hyperbolic transformations for which  $c = \infty$  and  $\theta = 0$ .
- (6) The one-parameter parabolic group  $G_1'$  with constant  $\theta$  in  $a = re^{i\theta}$  leaving a single point invariant.
- (7) The three-parameter group  $G_{3c}$  of type  $T$  and constant  $c$  in  $k = e^{(c+i)\theta}$  leaving a single point invariant.
- (8) The three-parameter group  $G_c$  of elliptic, hyperbolic and parabolic transformations leaving a circle invariant.
- (9) The two-parameter group  $G_{2c}$  of hyperbolic transformations leaving invariant a circle and a point on it.
- (10) The three-parameter group of elliptic transformations  $G_{1c}$ .

The real projective transformations of the plane and of space may be treated in the same spirit and by the same methods here employed for the circular transformations. The writer hopes to be able in the near future to publish the full results of his investigations in these fields.

UNIVERSITY OF KANSAS,  
March 6, 1897.

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#### PLÜCKER'S COLLECTED PAPERS.

*Julius Plücker's gesammelte mathematische Abhandlungen.* Herausgegeben von A. SCHOENFLIES. Mit einem Bildniss Plücker's, und 73 in den text gedruckten Figuren. Leipzig, Druck und Verlag von B. G. Teubner. 1895. 8vo, pp. xxxvi + 620.

The Kgl. Gesellschaft der Wissenschaften zu Göttingen, of which Plücker was a corresponding member, recently under-