Assume that $S-R_1'$ contains a point, say U, of M_2. Then by Condition 2 there exists an arc UE_3 contained in M_2+E_3. This is impossible for such an arc must contain a point of J_1. Therefore M_2 is contained in R_1. Similarly it can be proved that M_2 is contained in $S-R_2'$ and so in R_3. Similarly it can be proved that M_2 is contained in $S-R_3'$. Thus a contradiction is obtained. Therefore there do not exist three points of L.

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TWO CLASSES OF PERIODIC ORBITS WITH REPELLING FORCES*

BY T. H. RAWLES

1. *Introduction.* The purpose of this paper is to obtain certain classes of periodic orbits† of a system consisting of one body of very great mass which attracts two mutually repellent bodies of very small mass. The forces of attraction and repulsion in the system are assumed to vary inversely as the squares of the distances. It will be shown that if certain conditions of symmetry are imposed the orbits of the two small bodies must lie either in two parallel planes or else be coplanar. In the former case they are circles about a line perpendicular to the two planes and passing through the large body. For the second type of orbit a development in powers of a parameter will be obtained.

2. *The Equation of Motion.* By a proper choice of the units of time and space we can make the coefficient of the intensity of the attraction equal to 1. Then if K^2 is the

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† The orbits referred to were first calculated by Langmuir, who employed numerical integration. (Physical Review, vol. 17 (1921), p. 339.) They have been discussed by Van Vleck in his monograph on *Quantum Principles and Line Spectra*. (Bulletin of the National Research Council, Number 54, p. 89.)