

PROBLEM 80.—To TRACE THE PATH OF A POINT **F** WITHIN THE CIRCUMFERENCE OF A CIRCLE **AD** WHEN THE CIRCUMFERENCE ROLLS ON A STRAIGHT LINE **AB**. (Such curves are called trochoids or cycloids.)

With **E** as centre and **EF** as radius, describe a circle.

Divide the outer circle into any number of equal parts and join these to the centre, cutting the smaller circle in the points **b, c, d**, etc.

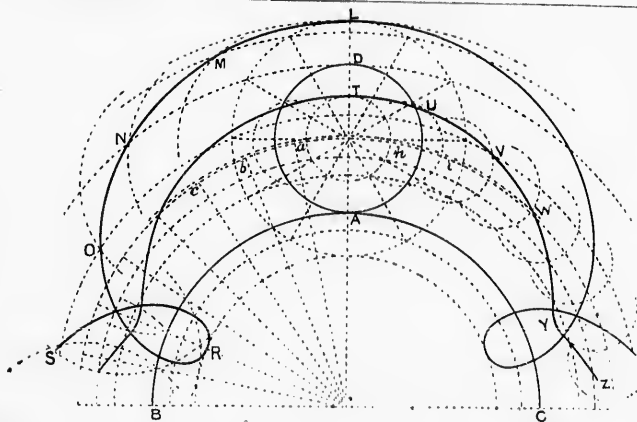
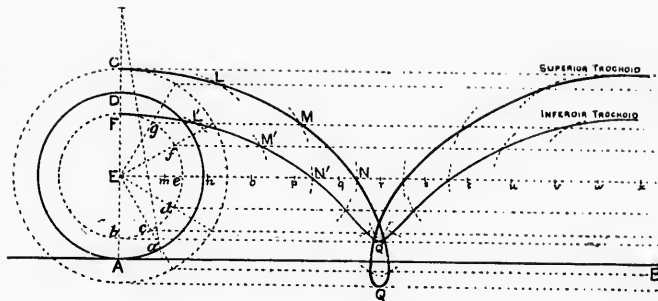
Take the rectified length of one of the parts **Aa** on the rolling circle and mark off parts equal to it on the line drawn through **E** parallel to **AB**. These lengths will divide the line in the points **m, n, o**, etc.

Through the points **g, f, e**, etc., draw lines parallel to **AE** and from the centres **m, n, o**, etc., with a length **EF** as radius, describe arcs (representing the successive positions of the smaller circle) to meet the parallel lines in the points **L, M, N**, etc. Join these points freehand to form the required curve.

PROBLEM 80 (a).—To TRACE THE TROCHOIDAL CURVE DESCRIBED BY A POINT **C** SITUATED WITHOUT THE CIRCUMFERENCE OF THE ROLLING CIRCLE.

From the centre **E** with **EC** as radius, describe a circle and make a similar construction to the former.

The resulting curve **L M N Q** will form loops where it falls below the directing line. The path of the point **C** is called the **superior or curate trochoid**. When the point is within the rolling circle, the curve is known as an **inferior or prolate trochoid**.



PROBLEM 81.—To DRAW EPI-TROCHOIDAL CURVES.

These are described when a circle rolls upon a circle and the generating point is within or without the circumference of the rolling circle.

The former is called the **inferior** and the latter, the **superior epi-trochoid**.

The construction is similar to that for the trochoidal curves. **L M N O** is a portion of the superior epitrochoidal curve traced by the point **L** when the circle **AD** rolls on the external circumference **BAC**, and **T U V W Y Z** is a portion of the inferior epitrochoidal curve formed by the internal point **T** under the same circumstances.