

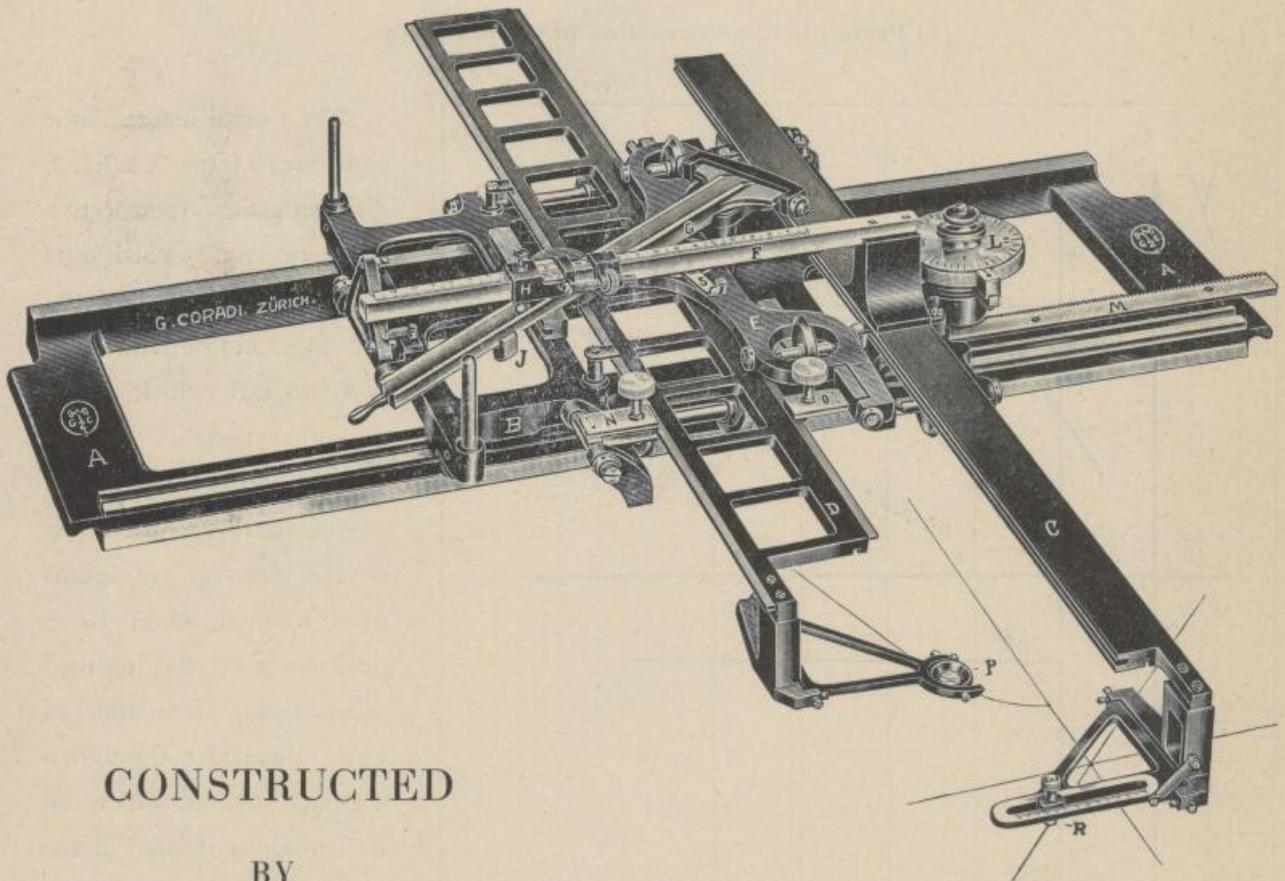
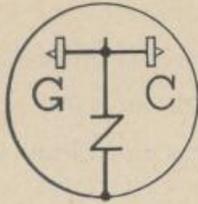
DIFFERENTIATOR

INVENTED

BY

Mier

Madrid



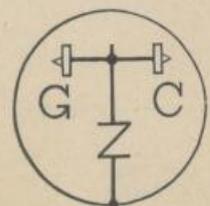
CONSTRUCTED

BY

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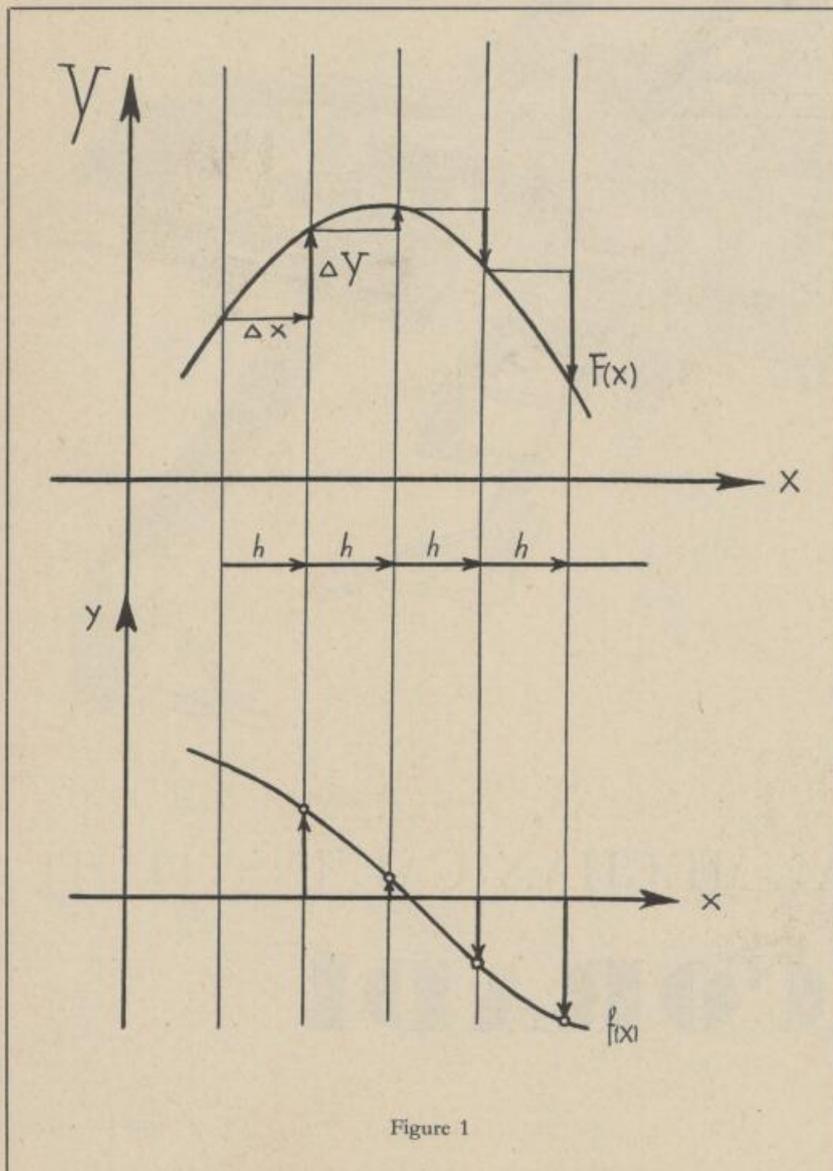
DIFFERENTIATOR

Description and instructions for use

The Coradi differentiator allows the curve of the difference quotients to be constructed point by point from a given curve. Use is then made of the following fact:

If $Y = F(x)$ is the equation of the given curve (fig. 1), and the x abscissa is divided into equal intervals of length $\Delta x = h$, the increase ΔY of the function for each such interval is proportional to the difference quotient of the given function. The Coradi differentiator, for a chosen width of interval, gives the points whose ordinates y are proportional to the corresponding ΔY .

(1) Principle of construction of the apparatus



The Coradi differentiator consists of a frame AA (fig. 2, diagrammatic and perspective illustration fig. 3) which rests firmly on the plane of the drawing. On this frame there is a slider B, which carries the other parts of the apparatus and which can be moved parallel to the x axis of the drawing by means of a toothed wheel L. A graduation on this toothed wheel makes it possible to move the slider through a constant amount, which can be chosen as desired at the start and is equal to the interval width h . On the slider there are two rulers C and D which can move in the direction of the Y axis. One end of the ruler D carries the setting mark P, and at one end of the ruler C the needle R is fixed with which the



measured point of the sought curve is pricked. The ruler D can be coupled either to the slider B, or by means of the ratio rod GF to the ruler C. This is effected by the screws N and O. The ratio can always be changed with the adjusting sleeve H, and in addition it may be increased in the ratio 1 to 2 by moving the lever S. The ratio is indicated on the ruler F for individual positions. In addition it can be found by dividing the length of the ruler F by 2.5 cm or by 5 cm.

(2) Method of operating

Set the apparatus on the drawing so that the frame AA lies parallel to the x axis. The ratio rod GT lies in the notched quadrant K, and therefore also parallel to the x axis. Then move the ruler D, with the screws N and O loosened, in such a way that the setting point P comes to lie on a point of the given curve; then fix the screw N. Pricking with the needle R gives the first point of the sought curve. Then move the slider B by means of the toothed wheel L through the chosen width of interval h; then couple ruler D to ruler C by tightening the screw O and loosening the screw N, and set the ruler D—guiding it by the handle T—to the new point on the given curve and fix it with screw N. A pressure on the needle R gives a further point on the difference curve. Then loosen the screw C and set the ratio rod in the notched quadrant. With the moving of the slider B, the operation begins again in the same manner as described above.

(3) Evaluating

The pricked points lie on a curve $y = f(x)$, whose x axis has still to be determined. For this purpose search on the given curve for a point with horizontal tangent; at the corresponding position the difference curve must pass through the x axis. The ordinate of the difference curve bears the following relation to the difference quotient:

$$y = h k \frac{\Delta Y}{\Delta x}$$

where h signifies the width of interval and k the ratio (see end of paragraph 1). Accordingly the smaller the width of interval, the lower will be the drawn curve. On the other hand, the interval width must not be chosen too large, otherwise details on the given curve would be lost.



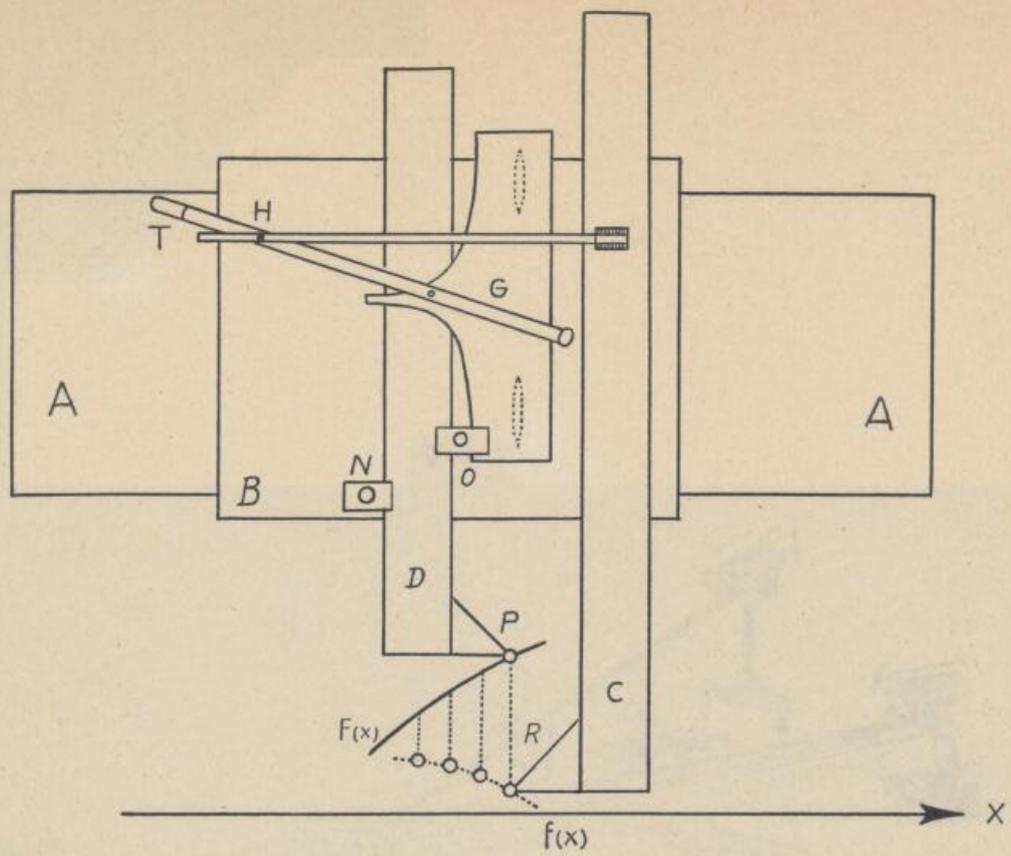


Figure 2

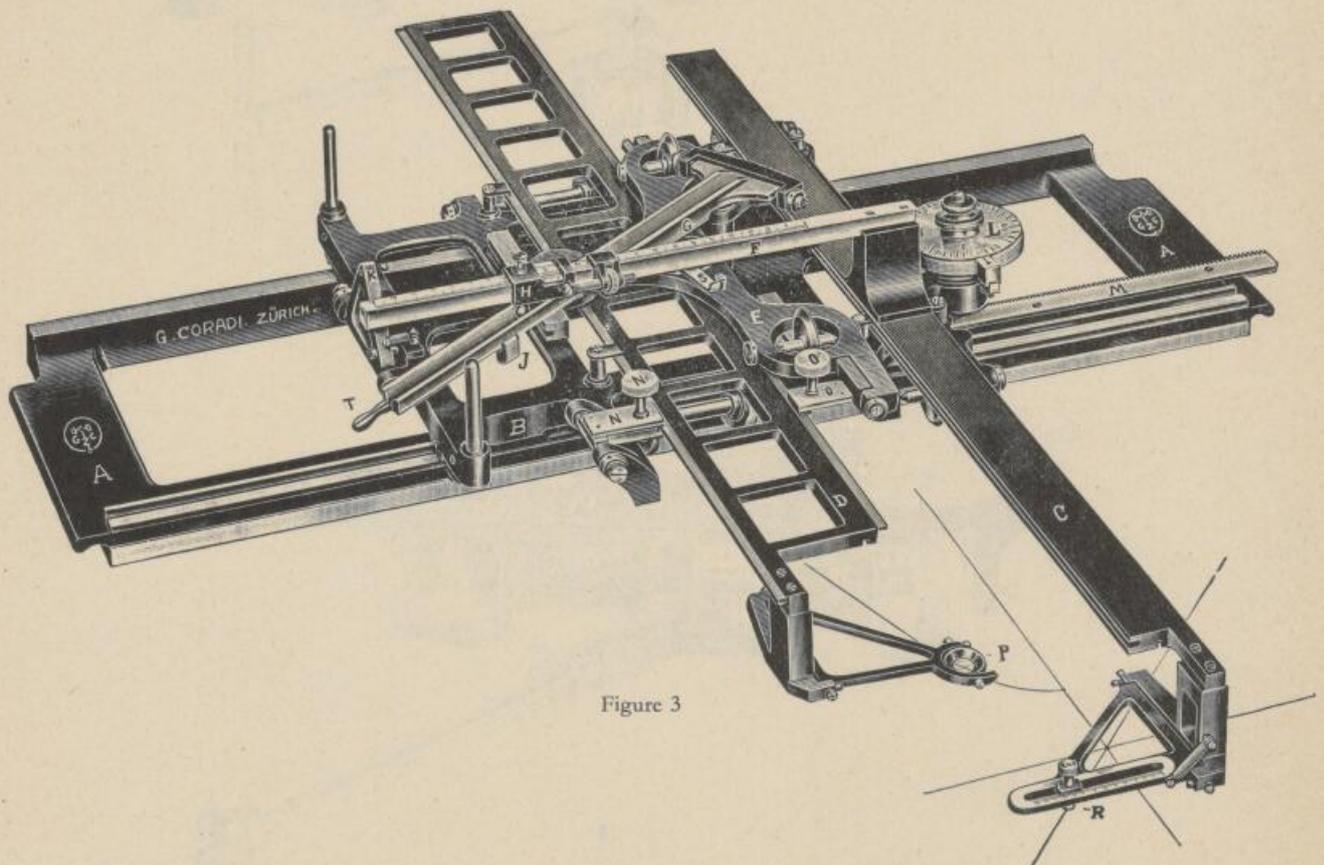
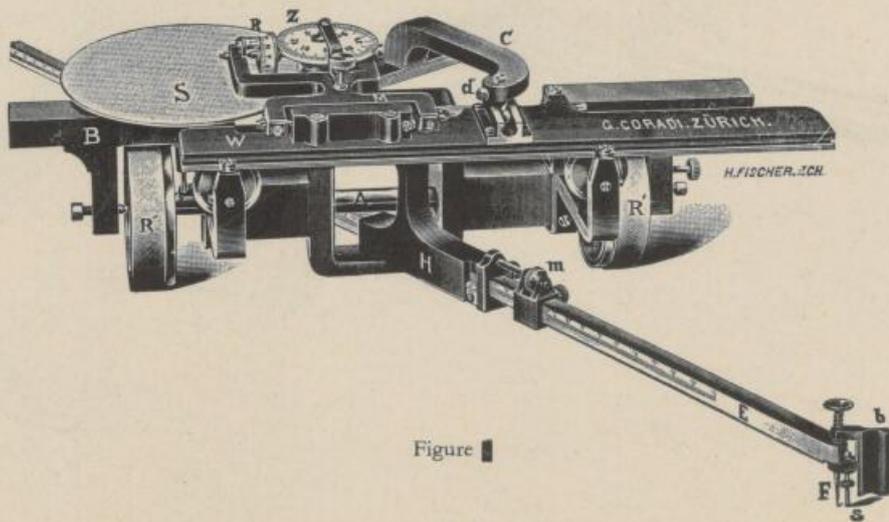
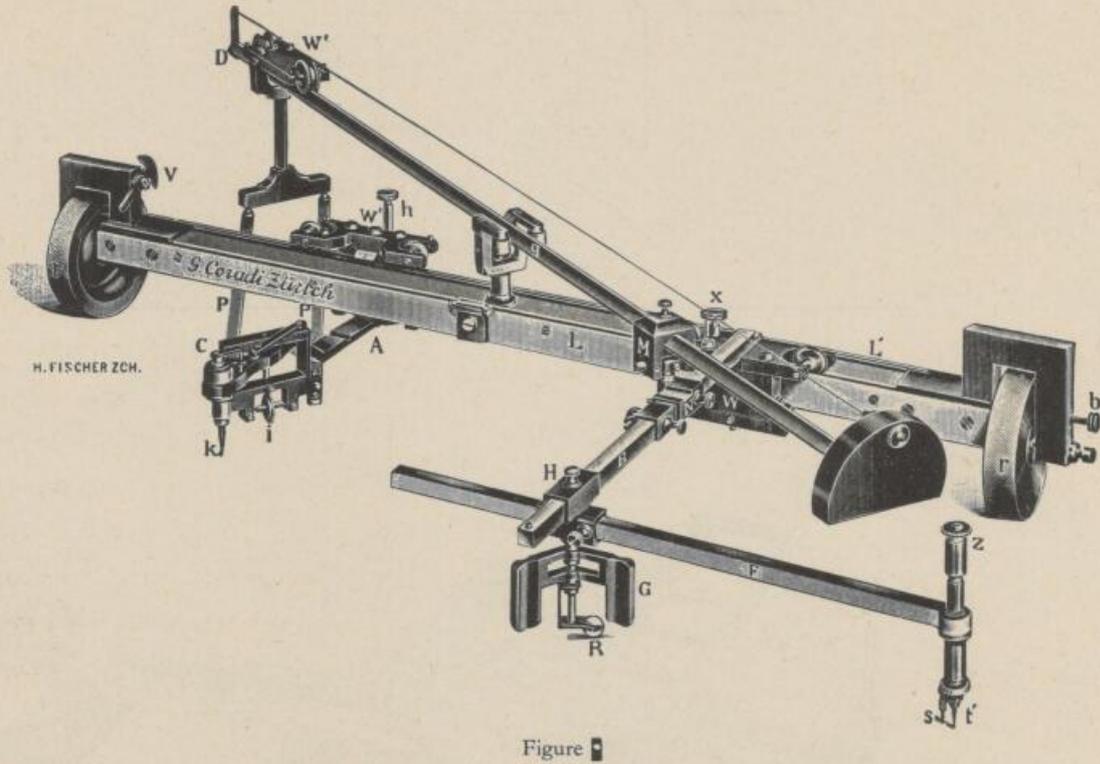
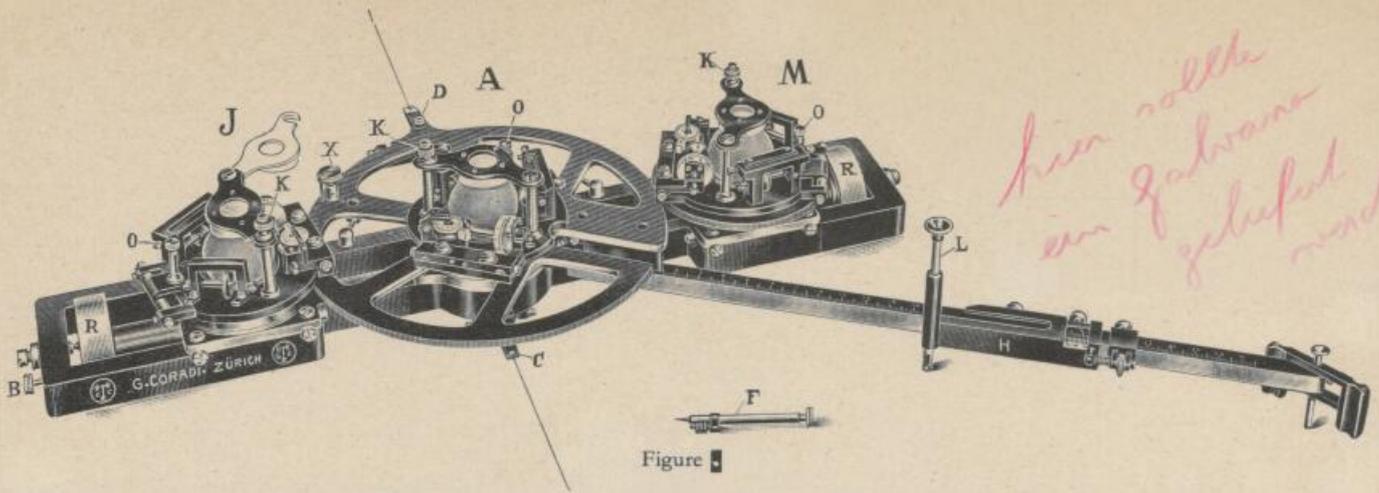


Figure 3





Planimètres Intégraphes

Intégrateurs Parabolographes Différentiateurs

Analyseurs Curvimètres Addographe Affinographe Apériodographe

Coordinatographe Pantographe

