HINTS TO HYDROGRAPHIC SURVEYORS

ON MULTIPLE BACKWARD RESECTION

by

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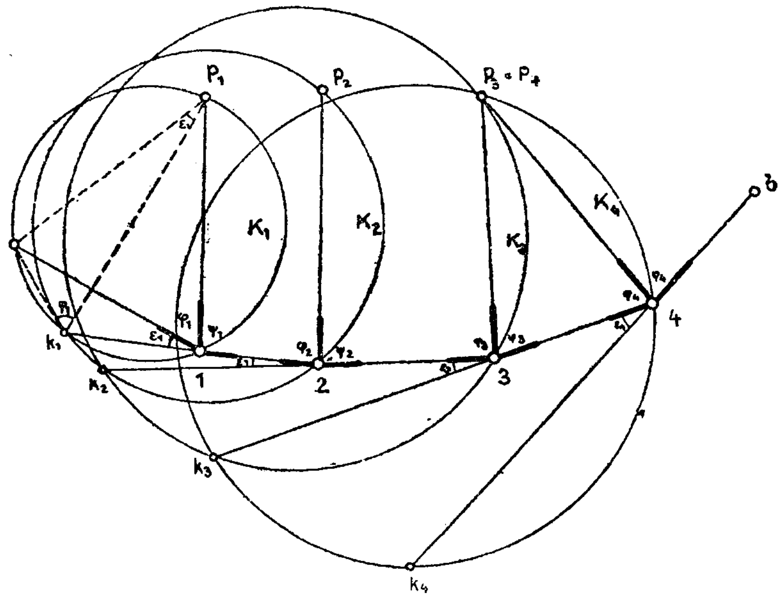
(Translated from the *Allgemeine Vermessungs-Nachrichten*, Berlin-Grunewald, 15th November 1939, page 654).

If n new points, 1.2 ....n are to be determined from $(n + 2)$ given points a, b, p_1 .... p_n, as seen in the figure, one has to do with an n number of backward resections. This problem may be solved in a similar manner as with the simple backward resection, i.e. by the determination of two auxiliary angles and subsequent direct resection.



For the special case where $p_1 = p_2 = ... = p_n = p$, Prof. Dr.-Ing. WERKMEISTER has given a method for the rapid progressive improvement of given approximation values for the auxiliary angles.

It is however also possible to reduce a multiple backward intersection to a purely manifold number of lateral resections, a method which corresponds to the simple backward resection with the aid of Collins' points. As a matter of fact, it may be shown that the proposition: "an n number of backward resections can be computed by $2\,n$ lateral resections", is fully proved.

By referring to the figure, it is easily seen that the new point 1 is located on circle K_1 determined by a, p_1 and φ_1. The ray (12), since it includes with (a 1) the given angle $\varepsilon_1 = 180 - (\varphi_1 + \Psi_1)$, must pass through that point k_1 of K_1 which, with a, yields the periphery angle ε_1. This point k_1, determined by lateral resection of a and p_1, will be called the Collins' point conjugated to new point 1. In precisely a similar manner the new point 2 is to be sought on the circle determined by k_1, p_2 and φ_2, and passes (23) through the Collins' point k_2 belonging to 3 determined by lateral resection from k_1, p_2, and so on. Finally, $\left(k_n b\right)$ gives the direction of (nb). n can now be determined by lateral resection from pn, and b, $n - 1$ by lateral resection from n, $p_n - 1$, and so on. Thus, for the determination of the Collins' points, there are required n, lateral resections; for the determination of the new points also n, consequently altogether $2\,n$ lateral resections are necessary for the solution of the problem.