

an X-ray tube containing a glowing filament, but we have overcome the difficulty very simply by covering the inner mercury meniscus with a layer of Apiezon high-vacuum oil. Fig. 1, which is self-explanatory, shows diagrammatically a tube which we have constructed and proved to work, not as yet, owing to lack of resources, with the large currents Müller has used, it is true, but still under sufficiently stringent conditions to demonstrate the essential soundness of the method. Even with ordinary steel steam tubes, unpolished on their inner surfaces, the vacuum was found to hold exceedingly well. The annular space containing the mercury was about

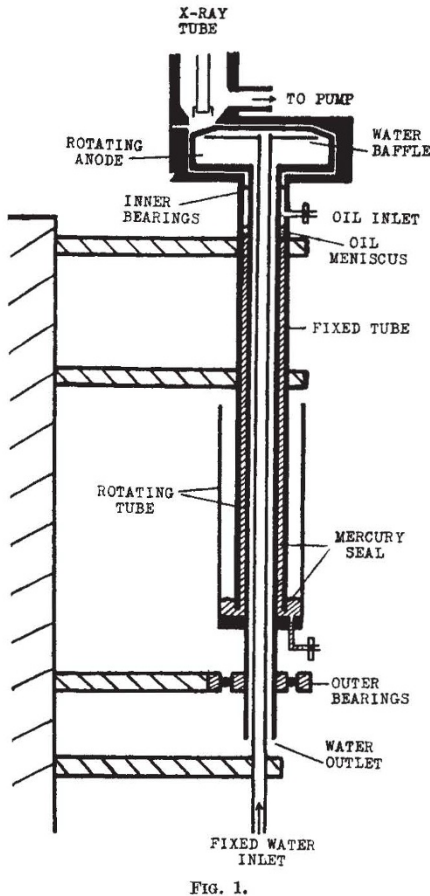


FIG. 1.

$\frac{1}{4}$ in. wide, and the pump used was a two- or three-stage oil diffusion pump. Incidentally, these experiments show that mercury gauges can safely be used in combination with such oil diffusion pumps, if the precaution is taken of covering the mercury meniscus with a layer of high-vacuum oil.

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¹ A. Müller, NATURE, 124, 128, July 27, 1929.

Radio-Geological Survey of Czechoslovakia

BOHEMIA is an excellent region for radio-geological investigation. In the first place, we have the ore region of Jáchymov (Joachimsthal), where pitch-blende is found. However, in the Krkonoše (Riesens Gebirge) and in the Jizera Mts., where there are no deposits of pitch-blende, strong radioactive springs (containing up to 200 Mache units) occur very frequently along faults, contacts, etc. This district has been investigated by us radio-geologically in the same manner as that in which Genser investigated the German portion of the Krušné Hory (Erz Gebirge)¹.

During the last three years, we have gathered together much material by various experimental methods. Chiefly, so far as was possible, the radioactivity of springs in the whole area of the Krkonoše was measured systematically. The content of radium emanation was measured at different seasons of the year, the springs and their radioactivity were then marked on maps, so that radiological maps of the terrain might be formed, as suggested by Vernadskyj. These maps will be made still more complete by the investigation of the soil-atmosphere. In highly active springs the flow of the water, found to be inversely proportional to its radioactivity, was measured and its dependence on meteorological factors determined. The springs are, therefore, regarded as superficial. Further, the amount of radium was ascertained in the water of the strongest springs (of the order of 10^{-11} gm. of radium element to 1 litre of water), and its quality by Elster-Geitel's mesothorium method. We have made also precise chemical analyses of the strongest springs.

At the same time, analyses of the rocks in the neighbourhood of the springs have been made with regard to their contents in radium elements. A simplification of Joly's method has been used, in which the rock is melted in the electric furnace, in cheap iron pans². Likewise, rock sections were studied from the mineralogical point of view. Correlation between geological structure and the analyses of waters and rocks were studied. It was proved, for example, that at Žalý (Heidelberg on Benecko) waters became radioactive on contact with phyllite (radium content, 8.3×10^{-12} per gm.) and orthogneisses (radium content, $4-7 \times 10^{-12}$ per gm.). The total length of contacts is so great that the amount of emanation in the springs of this district (100 Mache units) can be easily explained by the absorption of emanation by the water along this quite superficial contact.

A report of the first part of these investigations in the area of the Krkonoše will be published soon. We have dealt also with a large amount of material, especially from radiological investigations of the rocks from the ore region of Jáchymov and of rocks of organic origin from Bohemia and from Slovakia. This material will be completed and gradually published. The aim of the work is a radio-geological survey of the whole of Czechoslovakia.

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¹ Geol. Rundschau, 182; 1932.

² Běhounek-Santholzer, Gerlands Beiträge z. Geophys., 33, 60; 1931.