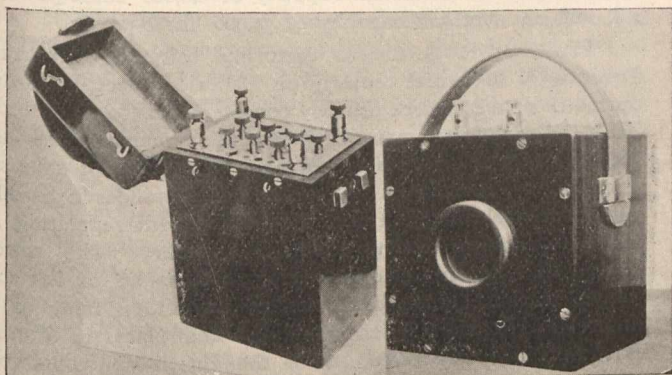


pliances, the standards often present the same difficulties and make it impossible to certify absolutely to the accuracy of the results obtained. In fact, the greater number of the errors and discrepancies in tests can be traced directly to lack of legibility of standards and to variations in the different instruments.

Manifestly, the ideal instrument either for taking measurements or for making comparisons with other measuring devices is one which will combine a great degree of legibility with a capacity for all ranges in which readings are to be taken, and any means by which these characteristics can be imparted to the instruments now in service is of practical value. The best method for accomplishing the desired result is by the use of transformers which will adapt the voltage or current to be measured to the capacity of the instrument to be used, adopting a ratio which will permit readings to be



taken from the most legible portions of the scale. By this means any difficulty in readings is obviated, uniform accuracy at all capacities is assured, and a single voltmeter, ammeter and wattmeter will fulfil all the requirements of the most exacting service.

The portable series and voltage transformers made by Westinghouse Electric and Manufacturing Company, the former of which is shown in the accompanying illustrations, are especially designed for this work. Ample insulation and generous amount of iron and copper reduce to a minimum the error of transformation. They are designed to give accurate ratios at the load which will normally be imposed on the secondary, by the ordinary type of portable instruments, the output of the voltage transformer being about .15 amperes and the maximum voltage across the secondary of the series transformer being about three volts. The series transformer is made in two types. In one, designed for primary currents up to 100 amperes, the ratio is changed by plugs, somewhat as in the Wheatstone bridge. In the other type, which is designed for larger capacities, there is a circular opening through the transformer, and the conductor is passed through this opening, forming the primary. In this type, the ratio is changed by the number of turns made by the conductor passing it through the aperture once giving a ratio of 400 to 5, twice a ratio of 200 to 5, and four times a ratio of 100 to 5. The voltage transformers are furnished in various capacities up to 750 volts primary, the standard secondary voltage at the maximum primary voltage being 150 volts. The terminals on the primary are arranged so that a number of primary voltages may be obtained although they are not usually required in a great range of capacities as is the case with series transformers. These transformers are mounted in finely finished mahogany cases with carrying handles. The terminals of the voltage transformers and the plug contacts of the series transformers are protected by a cover, which, for convenience in use, is made removable.

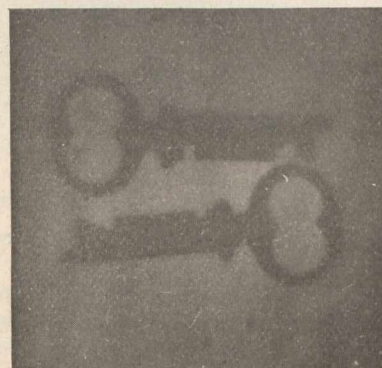


#### RADIUM-BEARING MINERAL IN QUEBEC.

In last issue mention was made of the interesting discovery by J. Obalski, Inspector of Mines, Quebec, of a radium-bearing mineral in an abandoned white mica mine back of Murray Bay. Mr. Obalski showed a specimen of the mineral at the meeting of the Canadian Mining Institute last month, and gave the following account of his discovery:

Since the new element, "Radium," has been discovered

attention has been called to the minerals containing it; and so far it appears that the Uranium ores are the only ones in which it has been found. In our Laurentian formations the Uranite, composed of oxide of Uranium and other rare metals, has been met with in the pegmatite dykes, which have been operated as producers of white mica; and we had only the record of the Villeneuve mine, in Ottawa county, with Monazite and Uranite, and the Maisonneuve mine, in the county of Berthier, with Samarskite, although we have several other white mica mines and prospects in the Saguenay district. About ten years ago I found in a white mica mine, then operated by the Canadian Mica Co., a remarkable specimen, which I identified as "Cloveite." This specimen has a specific gravity of 8.43, and weighs 375 grams, or about 12 ounces; it is well crystallized in dodecahedron form, being derived from the isometric system. A complete analysis has not yet been



A Radiograph, the Result of Nine Hours' Exposure Through a Piece of Wood.

made, but it contains 70.71 per cent. of uranium. Radium having been discovered and found to exist mostly in connection with Uranium ore, I experimented with the above mentioned crystal, and found it affecting strongly the photo plates, as shown by the accompanying radiographies. It had also a well-marked action on the electroscope. I came then to the conclusion that it contained Radium, and, to have my opinion confirmed, I showed the specimen to Professor Rutherford, of McGill University, who, after testing it, stated that its radio-activity was equal to four or five the one of the crystal if it had been entirely composed of Uranium, and that it contained one-tenth of a milligram of Radium, making it comparable with the best pitchblende so far operated for Radium.

This crystal may be an accidental one, although I have found other small pieces of the same mineral in this vein, but

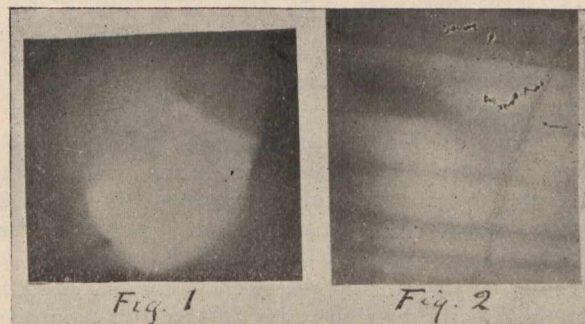


Fig. 1—Photo taken from Rays from the Crystal.

Fig. 2—Radiograph taken through Wood, showing Grain of Wood.

I have also found a carbonaceous material, burning quite easily, and leaving a large proportion of ashes, containing oxide of Uranium. I am not able to state what is the relation between the two specimens, but I think this fact important, and I propose to make a further investigation next summer. The white mica vein where those specimens came from is situated near the Lake "Pieds des Monts," about eighteen miles back of Murray Bay, in the county of Charlevoix, on the north shore of the St. Lawrence.

Specimens of the coal referred to have been tested by M. L. Hersey, of Montreal, with the following results: "This sample of coal has a fibrous, irregular structure, and contains