

ardless of the setting of the dial. The general expression for the galvanometer current in an unbalanced potentiometer has been derived and used as a guide in planning the circuits.

An instrument for voltage measurements on this principle has been constructed and used in the work of the Bureau of Standards. It has been found very accurate and much more convenient to use than a potentiometer of standard form. A second instrument will be constructed, in which more than one range will be provided for.

#### SELECTIVE REFLECTION IN THE INFRA-RED.<sup>1</sup>

By A. H. PFUND.

TO begin with it is shown that the character of the selective reflection of a substance is not affected by a change of state, so long as the molecule as a whole remains unaffected. Then the curves of selective reflection from liquids are discussed—especially of sulphuric acid. These curves change markedly with changes in the concentration of the acid. The effect is attributed to the formation of new ions. Finally, it is shown that the mechanism giving rise to certain marked bands of selective reflection in the infra-red is in all probability localized in that portion of the molecule which in solution becomes the negative ion. All of the results thus far obtained (involving work on sulphates and nitrates) fully bear out the above conclusion.

#### POLARIZATION IN THE INFRA-RED.<sup>1</sup>

By A. H. PFUND.

THE first part of the paper is taken up with a discussion as to the suitability of certain substances to act as polarizers in the infra-red. A new form of polarizer and analyzer is developed (involving the use of amorphous selenium), which has very decided advantages over existing forms. With these new instruments it is shown that Iceland spar in its region of metallic reflection transforms plane into elliptically polarized light by reflection.

<sup>1</sup> Abstract of a paper presented at the meeting of the Physical Society held April 20-21, 1906.