



A preliminary investigation of a submerged electrode for quantitative spectroscopic analysis
by Douglas N Stewart

A THESIS Submitted to the Graduate Committee in partial fulfillment of the requirements for the
degree of Master of Science in Chemistry

Montana State University

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Abstract:

The possibility of using submerged 60 cycle alternating current electrodes as a light source for quantitative Chemical analyst was investigated. The Intensities of the spectral lines produced were measured by means of a multiplier phototube. The studies were made using the internal standard method. A series of teste were made with lithium as the Internal standard and adding Mg, Ca, Zn and Cu in varying amounts.

A series of tests were also made using cadmium as the internal standard and adding Li, Mg, Ce, Zn end Cu In varying amounts.

A PRELIMINARY INVESTIGATION OF A SUBMERGED ELECTRODE
FOR QUANTITATIVE SPECTROSCOPIC ANALYSIS

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DOUGLAS N. STEWART

A THESIS

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at

Montana State College

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Graduate Committee

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I. ABSTRACT

The possibility of using submerged 60 cycle alternating current electrodes as a light source for quantitative chemical analysis was investigated. The intensities of the spectral lines produced were measured by means of a multiplier phototube. The studies were made using the internal standard method. A series of tests were made with lithium as the internal standard and adding Mg, Ca, Zn and Cu in varying amounts. A series of tests were also made using cadmium as the internal standard and adding Li, Mg, Ca, Zn and Cu in varying amounts.

II. INTRODUCTION

The submerged electrode used in this study was first investigated by Todd¹. He used it for qualitative determinations. A list of the elements and the lower limits of concentrations that can be detected visually was given by him.

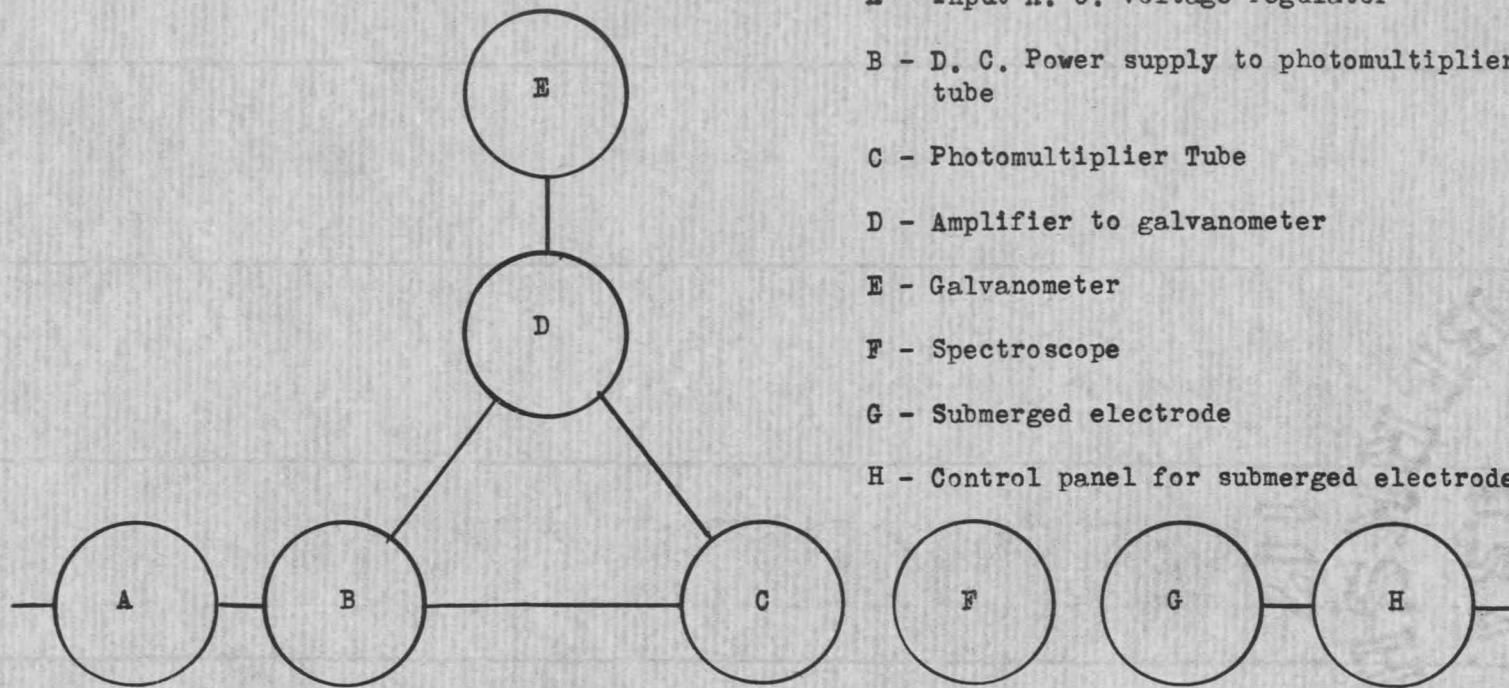
During previous work at this institution some changes had been made in the apparatus suggested by Todd. From those changes and observations it was thought that further investigation of the relation between concentration and intensities of the spectral lines produced, might result in a quantitative method of analysis of solutions.

With the possibility of a method for quantitative determination of elements in solutions in mind, it was decided to construct the necessary apparatus needed to operate a multiplier phototube, and a preliminary study of the effects of additional elements in the solutions was also to be made if the intensity of the light source was found to be adequate.

It has long been recognized that a light source capable of giving a homogeneous light for a considerable length of time would increase the usefulness of the spectroscope.

The possibility of obtaining additional information on the behavior of ions in solution was recognized in planning this study.

¹ J. Chem. Ed. V 15, p 241 (1938)



- A - Input A. C. voltage regulator
- B - D. C. Power supply to photomultiplier tube
- C - Photomultiplier Tube
- D - Amplifier to galvanometer
- E - Galvanometer
- F - Spectroscope
- G - Submerged electrode
- H - Control panel for submerged electrode

Arrangement of Instruments

Figure 1

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