ABSTRACT OF THE THESIS

THEORY AND APPLICATIONS OF THE PHOTOELECTRIC CELL

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The photoelectric cell has a large potential as an educational aid in the areas of science, especially those of general science and physics. It is not to be implied in any way that areas of chemistry and biology are not ideally suited in many instances. The photoelectric cell is economical and easily available and what this paper aims to show is that its range of use is amazingly large.

The adaptability of this teaching aid lends itself to a large number of experiments which have wide applications to a number of principles. The broad spectrum of its use ranges from measurement of the sun's power to ideas of control in the manufacturing processes. This educational aid provides a branching pathway of learning which fascinates and enhances. The concept of learning by doing is readily fulfilled and thus a great deal of motivation is provided.

The theory of photoemission has to explain the relationship between, on the one hand, the essential properties of radiation, i.e., intensity and wavelength, and, on the other hand, the number of released photoelectrons (in other words, the current collected by the anode of a photoelectric cell) and the energy of the photoelectrons. Four terms are crucial to the understanding of the theory of photoemission. These are: intensity of radiation, wavelength of radiation, photoelectric current, and energy of electrons.

The study of the theory of the cell is essential because the scope of the experiments varies directly with the ingenious applications, or more specifically with the depth of understanding of the user. A large part of

the paper is, therefore, reserved for given examples of its uses.

For a general survey it is useful to subdivide the applications of photocells into the following three groups:

(1) Definite fixed intensities of radiation have to be measured (Photometry).

(2) Variations of light intensity have to be reproduced without distortion.

(3) Relatively large changes in light intensity have to be detected.

It is this area of concentration in the paper that will form the nucleus to the still many other possibilities that exist. However, without having a full realization of the principles involved, one can nevertheless build in theory from one application to another. In other words, whenever an application is used, that particular application will add still more insight into the workings of the cell.

It is significantly important to note the natural offsprings of this cell, that is the related kinds of cells which form part of the family constituting the photoelectric cell. These form an integral study of the cell.

The author in no way implies that no other "new devices" can be created, but rather ardently hopes to see the evolution of still newer ideas of adaption and use in this direction.