PH. D. PHYSICS

R. L. THORNTON

THE STARK EFFECT FOR KRYPTON.

Krypton has been investigated in the region 4800 — 6700 A. in electric fields up to 86 KV/cm. A 28 foot concave grating in a stigmatic mounting was employed. A total of 45 lines were observed; the majority of these were affected by the field. No combination lines were observed; this is to be expected in view of the wide separation of the krypton terms. The observed patterns are of the abnormal type. Many of the components expected to appear are missing. Possible explanations of this are discussed. The observed displacements do not depend on the hydrogen differences, but are given qualitatively by the Pauli theory.

STARK INTENSITIES IN HYDROGEN AND HELIUM.

A new type of canal ray tube is described which may be operated at gas pressures as high as one-half mm. Results obtained for $H\beta$ show qualitatively that agreement with theory is obtained for both polarisations. This is in contradiction to previous results at lower gas pressures. A comparison of photographs of $H\beta$ taken from pure hydrogen and from a helium-hydrogen mixture shows no change in the intensity distribution. For helium also a general qualitative agreement with theory is obtained.

PH. D. PHYSICS

HORACE GEORGE ISBISTER WATSON

A NEW DEVICE AND METHOD FOR GEOPHYSICAL PROSPECTING.

When a conductor lies in an alternating magnetic field, currents are thereby induced in it. These currents produce a secondary field which combines with the primary field to produce a distorted resultant field about the body. A particular form of distortion is that known as elliptical polarization—a condition similar to that existing at the centre of a four pole induction motor with one set of field magnets weaker than the other. This type of distortion can only exist when a conducting body is present. Hence its presence is a certain indication of a conducting body.

The author's work deals with the application of this phenomena in geophysical prospecting.

A device was developed for measuring the degree, nature (clockwise or anti-clockwise) and direction of the polarization. This device, which is known as a ratiometer, is considered in detail as to its functioning, design and susceptibility to error. It is shown that it is remarkably free from errors of practical magnitude over the limits of changing conditions likely to be met in practice.

From elementary considerations it is shown that, for all practical purposes, the application of simple rules to the results of an examination of the polarization produced in the field of a horizontal primary loop will yield good information as to the plan and approximate information as to the dip, depth and width of a conducting body.

In practice some difficulty is encountered by untrained observers, in operating the device, because of harmonic frequencies in the power supply. Means are suggested for minimizing this trouble.

As far as the location of ore is concerned considerable trouble is met from conducting clay beds. To eliminate or minimize this difficulty several methods are considered theoretically. The use of the vertical loop seems the most promising. No experimental results have been obtained to check these theories.

Results of the successful application of the above ratiometer, and associated theory, to known ore zones in conjunction with the horizontal loop are given.

PH. D. PHYSIOLOGY

D. R. WEBSTER

STUDIES OF GASTRIC SECRETION UNDER NORMAL AND SOME PATHOLOGICAL CONDITIONS.

Studies were made of the composition of the gastric juice secreted under different stimuli, the results obtained affording further evidence that the different cytological elements of the gastric glands are under the control of separate mechanisms, either nervous or humoral. The secretory effect of carbon dioxide on the stomach was studied, and the results suggested that this might be one of the factors of an interdigestive phase of secretion. The gastric secretion was investigated in dogs with pyloric obstruction and it was proved that pyloric obstruction *per se* does not produce any hypersecretion or alkalosis. The mechanical phase of gastric secretion was shown to be dependent on the properties of the food introduced into the intestine. Fat proved to have an inhibitory effect on the first phase and an augmentary effect on the second phase of gastric secretion, exhibiting a selective inhibitory action on pepsin.