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Piezoelectric Measurements of Crystals with a High Sensitivity Lever

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RESULTS OF THE FIRST COOPERATIVE COLLEGE
PHYSICS EXAMINATION SPONSORED BY THE
AMERICAN ASSOCIATION OF PHYSICS
TEACHERS

C. J. LAPP

The Committee on College Examinations for the American Association of Physics Teachers, working in conjunction with the Cooperative Test Service, which is sponsored by the American Council of Education, have prepared two forms of an objective examination over mechanics, sound and wave motion. This examination was given to the students in fifteen cooperating colleges at the end of the first semester; involving more than 1000 students. The results of this cooperative examination will be discussed.

A second cooperative examination is now being prepared by the Committee for use at the end of the second semester.

STATE UNIVERSITY OF IOWA,
IOWA CITY, IOWA.

NEW CHARTS FOR THE RADIOACTIVE SERIES

C. J. LAPP

Very little that is new has been contributed to the arrangement of the three radioactive series in the past fifteen years. Recently Gamow and others have pointed out the desirability for a fourth series. Fred Allison and his co-workers have recently examined radioactive matter by a magneto-optical technique and report that they find 90 radioactive electrons and isotopes. These are arranged in four series. Substantial changes are made in arrangements of the three old series, particularly the actinium and the thorium series.

STATE UNIVERSITY OF IOWA,
IOWA CITY, IOWA.

PIEZOELECTRIC MEASUREMENTS OF CRYSTALS
WITH A HIGH SENSITIVITY LEVER

GEORGE FINK

For the measurement of piezoelectric deformations of quartz and tourmaline plates an amplifying lever system was designed and built. A lever ratio of 1864 to 1 combined with an optical

interference method of measuring the motion of the long end of the lever makes it possible to detect a displacement of the short end of only 0.15 Angström unit. The changes in thickness of quartz plates about two mm thick were measured with potential differences up to 500 volts between the electrodes on the faces of the plates. The piezoelectric constant of quartz found by this method using the converse piezoelectric effect is in fair agreement with the results of previous observers using the direct effect. The quartz crystals were found to be very non-uniform even though they appeared homogeneous in polarized light. The chief difficulty found in the use of the apparatus is in eliminating disturbance from vibrations.

IOWA STATE COLLEGE,
AMES, IOWA.

A SHORT STUDY OF BARKHAUSEN-KURZ OSCILLATORS

L. F. DYTRT

In the field of ultra-short waves as used in radio communications, oscillators of the Barkhausen-Kurz type should play an important part. The wave-length of these is dependent on the potentials applied to the grid and plate, and on the magnitude of the filament current, and is only influenced to a small degree by the leads connected to the grid and plate electrodes. Since the oscillations are caused by a purely mechanical to and fro motion of electrons about the grid, they are somewhat weak. In order to study oscillators of this type, one was built in an attempt to confirm the work of other experimenters, and to determine their practical possibilities.

IOWA STATE COLLEGE,
AMES, IOWA.

ON THE PIEZOELECTRIC PROPERTIES OF TOURMALINE

MORRIS UNDERWOOD

Oscillating piezoelectric plates of different frequencies have been made from California and South African tourmaline. These plates have a frequency response of approximately 3770 kc per millimeter of thickness. The temperature coefficient for both **specimens** was found to be negative and is about 25.5 parts per