

PHYSICS

Smallest Quantum Larger

Measurements made with the help of X-rays prove that the tiniest unit of energy is somewhat greater than former measurements indicated.

► THE SMALLEST "quantum" of energy, the amount that would be emitted by a single atom making one vibration per second, if that were possible, has been somewhat enlarged by new measurements made with the help of X-rays. The measurements were carried out by the physicist, Prof. Per Ohlin of the University of Uppsala, Sweden, and are reported in the current issue of the British journal of science, *Nature*. (Sept. 18)

Previous measurements by this method gave results 0.3% to 0.4% smaller than those calculated from the atomic theory and other experimental data. The discrepancy was due, Professor Ohlin pointed out, to the difficulty of determining just where the X-ray spectrum ends on the short wave side, which is the principal observation required by this method. This is as difficult as, or more difficult than, determining precisely where the edge of a rainbow is, especially on the blue side.

A more precise way of determining this limit removed the difficulty and gave results in satisfactory agreement with those calculated from the atomic theory.

The quantity determined by this method is not directly the smallest quantum, Planck's radiation constant as it is more familiarly known to the physicist, but its ratio to the smallest electric charge,

h/e . Professor Ohlin's final result for the ratio is 1.3787 divided by 10^{17} (1 followed by 17 zeros) which is the same, within the limits of experimental error, as that derived from the atomic theory. Since the smallest charge, e , is known h is readily found.

To find the precise point where the X-ray spectrum fades to nothing, the method had been to use a narrow band of the spectrum near the end and measure its increasing intensity as the voltage was raised. A curve of these intensities was then plotted, and the curve was extrapolated downward, continued by the eye, to the level of zero intensity. This should have given the voltage at which that particular band of X-ray frequencies began to be emitted, but it didn't quite.

Professor Ohlin, by using a much narrower band and changing the voltage by very small steps (2 volts), which was made possible by the use of a more powerful and efficient X-ray apparatus, found an irregularity at the lower end of the curve quite undisclosed by the previous coarser measurements. This accounted for their failure to get a result in agreement with that derived from the atomic theory, which result is thus confirmed and may be taken to be correct together with the theory and measurements on which it is based.

Science News Letter, December 4, 1943

MEDICINE

Fast Syphilis Treatment

Two speeded methods are giving good results, report of the first year of their use at a Chicago center shows. Patients usually complete course of treatment.

► GOOD RESULTS with two of the modern fast methods of treating syphilis are being obtained at the Chicago Intensive Treatment Center, it appears from a report of the first year of the Center's operation. (*Journal, American Medical Association*, Nov. 27)

A total of 931 patients, all of whom submitted voluntarily to the treatment, were given the so-called one-day treat-

ment with fever and chemicals. Actually they are in the hospital seven days. During one of these days they spend seven hours in the fever cabinet. A single dose of bismuth is given 24 hours previously and while the patient is in the fever cabinet, three doses of an arsenical are given.

Of these 931 patients, two died. Following the second death the treatment

was modified somewhat and in the next 242 consecutive cases there were no deaths. There were relapses in 49 patients, just over one-fifth. The dosage of the arsenical drug was then increased somewhat, and in the last 488 patients there have been no deaths and only eight relapses.

Another 390 patients were given intensive chemical treatment without fever. They are given the arsenical twice daily for seven days and bismuth once every second day for four doses. They remain in the hospital for two weeks. There have been no deaths in this group. The re-

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