PHYSICS

Atoms Pay Tax; But Energy Not Money Is the Medium

INCREASED taxation has reached down into the realm of atomic particles so small that millions of them could be laid side by side and not reach the width of a dime.

The atom tax is not in the form of money but energy, according to new experiments described to the meeting of the American Physical Society by Dr. G. L. Locher and C. L. Haines of the Bartol Research Foundation.

The energy atom tax occurs in tests on the changing of radiant energy into matter.

In the work reported, gamma rays from a radium-like substance were shot into lead and silver, and particles of matter in the form of positive and negative electrons emerged.

The nuclei or cores of atoms possess the power to transform such gamma rays into material particles.

The speed at which the particles come out is automatically recorded by the Locher-Haines apparatus. The incoming gamma rays possess a known amount of energy and the atom nucleus acts as a judge to decide how the energy is to be shared among the two new-born particles of matter.

It was expected that sometimes the negative particle would be cut off without inheritance, as it were, the positive particles then acquiring the full energy of the deceased gamma ray.

Such is not the case, Dr. Locher and Mr. Haines found.

The positive particle never has this much energy. Perhaps the atom nucleus decides that the negative electron shall never be sent out without some inheritance in the form of energy. The alternative would be that an inheritance tax is always collected from the positive particle.

Science News Letter, December 14, 1935

RADIO

Radio Through Lightning Possible Without Static

VISIONS of the day when a severe electric thunderstorm will no longer bring crashing static in home radio receivers became a virtual reality when Maj. Edwin H. Armstrong, Columbia University's professor of electrical engineering, showed his radio colleagues his static-free, non-fading system of radio transmission.

From a small experimental radio station atop the lofty Empire State Building Maj. Armstrong has been testing the system for over a year with receivers scattered about the metropolitan area.

Signals from the little 2,000 watt station were recorded 85 miles away on a phonograph record while a bad lightning storm was in progress. Uninterrupted reception and no static was the result. For comparison WEAF'S 50,000 watt station, recorded at the same time, gave signals full of crashing jars and often unintelligible.

Maj. Armstrong also sent a radio facsimile copy of the front page of a newspaper through electric storms. Clear readable copy was received. The absence of blurriness denoted the freedom from static. At the same time a musical program was simultaneously transmitted.

This is the first time in his experiments, Maj. Armstrong said, that music and the printed word have been sent and received together.

Fundamental point about the new static-free system, Maj. Armstrong explained before the Institute of Radio Engineers, is the introduction into the transmitted waves of a characteristic which does not exist in radio waves that nature created in causing static. The receiving set is so constructed that it picks up those radio waves having the special "man-marked" characteristics and discards the natural ones of static.

"The theory on which the problems were solved," declared Maj. Armstrong, "flies directly in the face of all previous mathematical deductions. The old theory of the way to shut out static assumed that the best that could be done was to narrow the band of the selective systems at the receiver as much as possible without shutting off the signal. By narrowing the band down to a width just sufficient to admit the signal it was believed that the ratio of signal to static strength would be best.

"Where the signals and disturbances are of the same order of magnitude, I find the exact opposite to be true. With proper methods of transmission and reception, the wider the band, the better will be the signal to noise ratio."

The Armstrong experiments have been carried out on a wavelength of two and one-half meters and have applications, it is indicated, in television broadcasting.

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MEDICINE

Widely Used Sex Hormone Obtained From Whales

WHALES will soon be rescuing women from some of the physiological disturbances connected with their sex, as soon as application is made of research conducted jointly by the Antarctic research ship, "Discovery," the British Museum of Natural History and the National Institute for Medical Research, London.

A female sex hormone known as progestin and widely used in gynecological practice can be obtained as a by-product of the whaling industry instead of from sows killed in slaughter houses. The hormone, surprisingly enough, can be obtained under ordinary whaling conditions and can be preserved in formalin for many months. Authorities believe that the hormone from whales will be widely used, at least until the hormone can be produced synthetically on a commercial scale.

Progestin is produced by the corpora lutea of the ovaries. Besides playing a secondary sex-stimulating role, it prepares the uterus for reception of the fertilized egg and pregnancy.

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