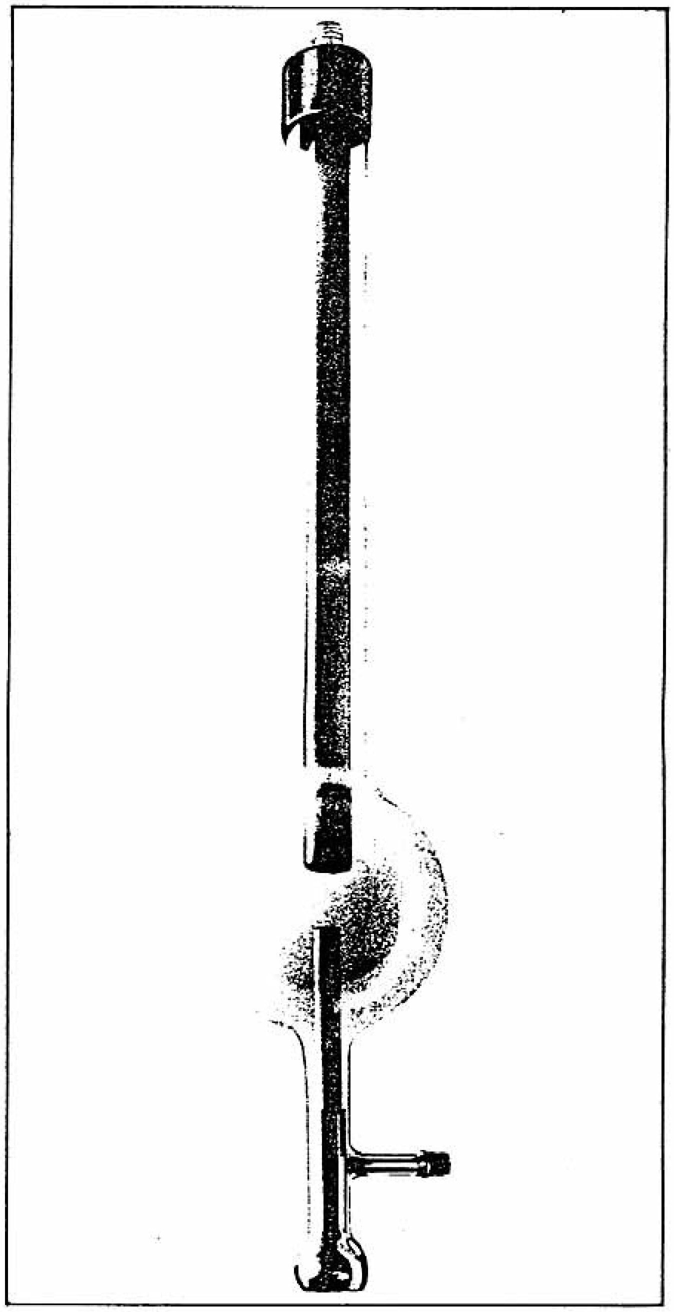
ELECTRONIC TUBES

INFORMATION BULLETIN

SPECIAL PRODUCTS DEPARTMENT WESTINGHOUSE LAMP CO., BLOOMFIELD, N. J.

NO. 1 JUNE, 1936

THE WESTINGHOUSE LENARD RAY TUBE
TYPE WL - 785



USES

There is much evidence already collected regarding the effect of Lenard or Cathode Rays on germs of seeds which are radically changed by even short time exposures. Observations have shown that X-rays cause mutation of the species to occur due to liberated electrons, and it is likely that the ultimate action of the electrons which make up Lenard rays is similar.

Exposure of plant tissues to Lenard rays has resulted in rather prompt drying up of exposed portions. Bacteria are killed by even short exposure to Lenard ray tube radiations. Fruit flies and cockroaches, which come within the electron beam field, are promptly killed by exposure to the rays.

As shown by fluorescence tests and visual investigation in a dark room, the electrons travel from the window end of the tube to produce an elongated spherical field which has a useful influence through distances up to 12 inches. Willemite and lime will give a fluorescent glow when exposed to Lenard rays and exposure of calcite produces scintillations.

Another remarkable, and as yet unexplained, effect of these rays, is the production of a color change in various salts. Sodium chloride is changed first to yellow and then to black. The yellow fades out in the course of a few days, but the black is permanent unless heated. Potassium chloride changes to purple and fades out in a few hours. Caesium chloride becomes a light blue which disappears in a few minutes. It is interesting to note that these colors are similar to the flame spectra of these elements and the color persistence is an inverse function of the atomic weight.

Lenard rays are useful in examining gems as the fluorescence, or lack of it, permits the rejection of imitations, as contrasted with those which are genuine. Lenard rays produce certain changes in chemicals and influence the reactions in some chemical processes. For instance, starch and glycerin become acid upon exposure and castor oil forms an insoluble compound.

The Lenard Ray Tube is many times as efficient in producing electrons in air as any other known device. This is due to the fact that high speed electrons are the primary output of a Lenard Ray Tube, rather than a secondary effect. An X-ray tube, for example, is not particularly suitable for this work as its rays are not efficient in releasing free electrons. Unlike X-rays, the Lenard Rays do not penetrate very far into material objects.

DESCRIPTION

The Lenard Ray Tube derives its name from Lenard who, in the later 1880's was the first to eject the electron outside the vacuum tube in the form of a cathode ray and thereby permit the study of its effects without the necessity of working within the evacuated space. It is now possible to obtain more conveniently a large quantity of electrons in the open air and the entire field of investigation of their uses still challenges the scientific world.

The Westinghouse Lenard Ray Tube is able to produce a large amount of cathode rays in air. This tube, due to the thin window construction, requires no exhaust system, hence it may be used wherever suitable power is available.

The tube consists of a vacuum-tight chamber with a thin glass window in one end through which the electrons constituting the cathode rays are emitted. The filament is mounted and operated in a long cylindrical tube or stem at the end of the chamber opposite the window. This tube is so designed as to produce a focussing effect to the emitted electrons. These electrons are caused to pass at a very high speed from the filament to the anode due to the high positive voltage which exists across the tube. The anode also is hollow cylindrical shaped and the focussed electron beam is so directed as to pass through the anode and the window into the surrounding air.

An important feature of this tube is the thin glass window located adjacent to the anode. The glass forming the window is less than a thousandth of an inch thick; hence, it permits the high speed electrons to pass out into the open air with very little loss in velocity. The glass is so thin that it would not be self-supporting except for the fact that it is drawn into a bubble or hemispherical shape so that it takes a natural contour. A window of this type is vacuum-tight; hence, it is not necessary to keep the tube connected with an exhaust system while it is in service. This means that the tube can be conveniently used wherever power is available, just like any other vacuum tube. The window is coated on the outside with aluminum foil and a carbon coating which permits any electrical charge which may accumulate on the window to be dissipated.

The power requirements merely involve a direct current or alternating current supply for the filament and a corona-free rectified source of high voltage power for the plate. The anode and the window may be operated at ground potential and the entire unit can, therefore, be built so that there need be no electrical hazard to anyone using the tube.

TYPE WL 785 DATA AND RATINGS

Max. Filament Potential	10 volts
Filament supply designed for	4 amperes
Filament type	Tungsten
Maximum Anode Potential	250 kilovolts
Minimum " "	100 "
Anode supply designed for	200 watts
Maximum Overall Length	33 inches
Maximum Diameter	6-1/8"
Filament Base	Medium Screw

REFERENCES

Lenard Ray Tube with Thin Glass Window - by C. M. Slack

Journal of Optical Society and Review of Scientific Instruments, page 123, February, 1929.

Measurement of Lenard Rays-by L. S. Taylor
Bureau of Standards, Journal of Research, page 57, July, 1931.

The Production of High-Voltage Cathode Rays outside of the Generating Tube - by W. D. Coolidge
Journal of the Franklin Institute, page 693, December, 1926.

Some Experiments with High-Voltage Cathode Rays Outside of the Generating Tube - by Coolidge & Moore
Journal of Franklin Institute, page 722, December, 1926.

The Action of High Speed Cathode Rays on Acetylene - by McLennan, Perrin, and Ireton
Proceedings of Royal Society, page 246, September, 1929.

For prices and further information write to

Special Products Sales Department,

Westinghouse Lamp Company,

Bloomfield, New Jersey.