cancer research which will destroy all tissue more effectively than X-rays, but they want a radiation which will be more destructive to tumors than to normal tissue.

If it should prove that neutrons are ten times as destructive as X-rays to tumors and only three times as destructive to normal tissue, then the new neutron rays would be a tremendously more beneficial radiation to use in cancer research. This fortuitous situation cannot now be hailed with certainty, Dr. Zirkle indicated, but the results so far are encouraging.

*Science News Letter, July 4, 1936*

PHYSICS

# 1,200,000-Volt X-Ray Tube Is Now Under Construction

PRODUCTION of medical radiation greater than all the refined radium in the world is one of the advantages claimed for the super-X-ray machine being constructed by the Kelley-Koett Company, Covington, Ky.

It is estimated that it would cost $100,000,000 to produce sufficient radium to equal the quantity of radiation available in the super-X-ray.

The machine, the largest in the world, will be used in the treatment of cancer. Four patients can be treated at one time by use of the 1,200,000-volt apparatus. It is now being built at a cost of approximately $75,000, for the Miller Hospital, St. Paul, Minn.

The 27-foot tube, in which electrons will bombard a gold electrode to create the radiation necessary for cancer treatment, has already been completed. Tubes in ordinary X-ray machines are dwarfed when placed beside the gigantic "medical battlefield."

When complete the machine will be 35 feet high, 24 feet wide, 33 feet long. Ordinary X-ray machines are 100,000-volt equipments. A few 800,000-volt and 400,000-volt machines are in use.

Not only will the radiation of this new giant of the medical world be greater than that of the world's supply of refined radium, but the machine's radiation will have greater penetrating power. The tube itself is protected with four inches of lead to prevent the radiation except where it is desired.

Three feet of concrete will separate the tube from the operator when it is installed, to protect him from radiation.

The object of the super-ray is to penetrate into the body to treat cancers which cannot be treated at the present time because of burns which would result. The great penetrating power makes treatment possible where serious X-ray burns would result on the skin with less penetrative machines.

The target of the tube, or the X-ray producing electrode, will be of gold, five inches in diameter and one-sixteenth of an inch thick.

Gold is used because of its high atomic weight. The electron streams bombarding it will produce a more penetrating radiation than with metal of less atomic weight. Ordinarily, tungsten is used for such targets. The tube itself is of indestructible porcelain and metal.

*Science News Letter, July 4, 1936*

***ATOM SMASHER***

***Dr. J. M. Cork, University of Michigan physicist, stands beside the newest of all cyclotron equipment which scientists use to smash atoms and probe the secrets locked in atomic nucleus. Largest in the world, including even the famous apparatus of Prof. E. O. Lawrence at the University of California, the device weighs over 95 tons.***

PHYSICS

## World's Largest Cyclotron At Michigan University

NINETY-FIVE tons of iron and copper form the giant electro-magnet which is the foundation of the world's largest cyclotron, now under construction at the University of Michigan. Alteration of atomic structure, already accomplished with other cyclotrons, may be carried much farther with the Michigan apparatus. It will have practical application in the preparation of radioactive salts for use in the treatment of cancer, in addition to offering an opportunity for scientific investigation of the composition of atoms.

The magnetic field which the electromagnet produces, the greatest integrated field ever developed, causes the rotation of ions, electrified particles, introduced into the duants, or halves, of a flat cylinder. The speed of these ions is accelerated by a 30,000-volt impact each time they cross the dividing space between the duants.

In 200 revolutions, according to Dr. James M. Cork, who is directing the construction of the cyclotron, the ions attain a speed equal to that which would result from an impact of 10 to 12 million volts. As an ion accelerates, its orbit grows larger, until it reaches the outer edges of the duants, where a deflecting blade diverts it against the desired target. This collision causes the breakdown of the atom through the disruption of its nucleus.

*Science News Letter, July 4, 1936*

Cherries are considered a good source of vitamin C.