

jumping to such an extent that 390 patents were granted for the week of July 13, 1886.

50th Anniversary Patents

On that 50th anniversary date, Elihu Thomson, one of the champion inventors of the country with a record of some 700 patents to his name, received a patent for a socket for incandescent lamps, which is the forerunner of that used today in automobile headlight lamps. Ottmar Mergenthaler, inventor of the linotype machine, was granted patents for improvements in casting type.

Jumping another 50 years to 1936, the Patent Office is granting some 800 patents each week, covering every phase of scientific endeavor. On April 30, 1935, it granted patent No. 2,000,000. Seventy-five years had passed before patent No. 1,000,000 was granted in 1911, but only 24 years before No. 2,000,000 was issued.

Applications for patents come from every country in the world. All applicants now pay the same fee and Britishers are no longer charged \$500. Everyone, it seems, has a bit of Edison in him. Abraham Lincoln obtained a patent for buoying boats, John Jacob Astor patented a street sweeper, and Secretary Harold Ickes has a patent on a dahlia.

Some 15,000 women have been granted patents. A woman patented the modern paper bag, and a Mrs. Martha J. Coston is the inventor of a signal flare used by seamen all over the world. One woman, the "Lady Edison," has some 50 patents to her name.

In a group of patents just granted, you will find inventions on television, a device for controlling the ionic content of air, a car which speeds over tracks and instantly detects flaws in rails, more efficient electron tubes, and devices for cracking oil which increases the yield of gasoline.

In one respect the Patent Office conducts a big ten-cent store, selling for this sum duplicate copies of the 2,040,000 patents on file. Some 7,000,000 of these so-called "soft copies" are sold yearly.

All of which means that Uncle Sam has something really worth while to celebrate in this centennial of the modern patent system. In one of his speeches made when he was dedicating a library, Abraham Lincoln said that the establishment of the American Patent System was one of the three greatest events in world history.

Science News Letter, July 4, 1936

MEDICINE

Diabetes Treatment Improved By New Insulin Compound

THE advantages of protamine insulin over ordinary insulin in the treatment of certain cases of diabetes were proclaimed by one of the co-discoverers of insulin, Prof. C. H. Best of the University of Toronto, at the meeting of the Canadian Medical Association, at Vancouver.

The new kind of insulin was developed by Danish scientists. It was not intended to supplant ordinary insulin in cases of diabetes which can be satisfactorily controlled by insulin alone, but was found a valuable adjunct to insulin in treating cases of severe diabetes. Protamine insulin is relatively insoluble and tends to be absorbed slowly and over a longer period of time than ordinary insulin. Consequently its blood sugar lowering effect lasts longer—twice as long, in fact.

"The work of the Danish group on protamine insulin has been abundantly

confirmed," Dr. Best said. "Various groups of clinicians in Boston, Toronto, London, and Rochester, Minn., have found that the duration of insulin action is much extended when insulin is combined under appropriate conditions with protamine."

Dr. Best and his associate, Dr. Robert Kerr, found that dogs having no insulin-producing pancreas tissue could be kept free from symptoms of diabetes by one injection of protamine insulin daily. At least two injections of regular insulin are needed to accomplish this result. The fluctuations observed in the amount of sugar in the blood when regular insulin is used are avoided with protamine insulin.

The use of protamine or some even more satisfactory agent will make it possible, Dr. Best said, to maintain certain diabetic patients in a much more normal condition.

Science News Letter, July 4, 1936

PHYSICS-MEDICINE

Hope Neutron Rays May Prove More Efficient Than X-Rays

EXPERIMENTS on the ability of the new neutron rays of science to produce biological changes in living organisms show that they are much more efficient than X-rays, Dr. Raymond E. Zirkle, Johnson Foundation for Medical Physics at the University of Pennsylvania, told the meeting of the American Association for the Advancement of Science.

The ultimate hope of the investigators, Dr. Zirkle revealed, is that the neutron rays will be more destructive to tumorous tissue than to normal tissues. This differential destructiveness is possessed to a certain extent by X-rays, but if the neutron should prove to have it to an even greater degree, it would thereby be a much more potent radiation with which to attack cancer.

"The results to date," he declared, "do not yet justify the prediction of such an extremely fortunate outcome, but are nevertheless distinctly encouraging."

The neutron—one of the fundamental building blocks out of which atoms are built—was only discovered in 1932. Even yet the sources for creating neutron beams for biological study are so weak that only beams of low intensity can be used.

But the encouraging thing, Dr. Zirkle said, is that the effectiveness of neutrons for any certain amount of their ionizing effect (which is the way in which all such rays act on biological material) is greater than that of X-rays. The relative effectiveness has been found to be, for different biological materials, from three to ten times in favor of the neutrons.

Moreover, and still more encouraging, the neutron-X-ray ratio of effectiveness is not the same for all living tissue. "This is of tremendous importance," said Dr. Zirkle.

The reason, he added, is that scientists not only want some ray for their

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 destruc-

tive 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 treat-

ment, 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.

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PHYSICS

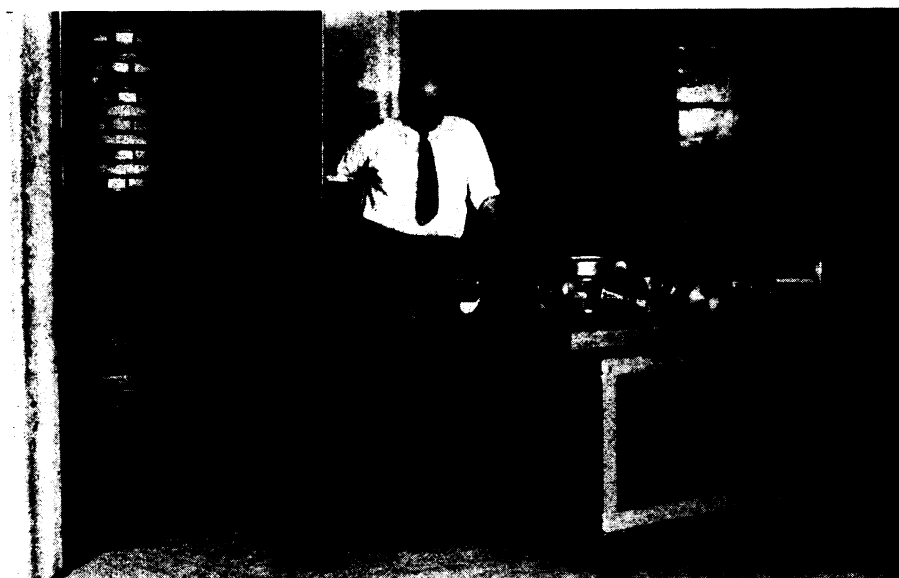
World's Largest Cyclotron At Michigan University

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 electro-magnet 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.

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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.

Cherries are considered a good source of vitamin C.