

versity of Toronto indicate. (*Science*, Dec. 13)

The two physiologists had a full-grown beaver, weighing forty pounds. They pushed the animal's head under water. Immediately the beaver relaxed and lay with its head on the bottom. It made no effort to escape for fully five minutes, but then struggled to come to the surface.

During its period of enforced immersion the experimenters felt carefully for its heartbeats. There were from six to ten normal beats at the start, but after that the observers could not detect any. When the beaver came up to breathe, its heartbeats became almost twice as rapid as they had been before its "ducking," although its breathing

rate showed very little increase. The animal was paying off its "oxygen debt," accrued while it was under water. The experiment was repeated several times, always with the same results. There was no cruelty involved so far as the beaver was concerned, since like all aquatic air-breathing animals it is used to staying under water for fairly long periods.

The absence of any detectable heartbeat of course does not mean that the heart has stopped entirely, but that it has greatly slowed down. The hearts of hibernating ground-squirrels and similar small animals in their winter sleep show the same slowing down almost, but not quite, to the point of complete stop.

*Science News Letter, December 28, 1935*

PHYSICS

## Artificial Radioactivity From 8 Elements Reported

**T**RANSMUTATION of the elements and artificial radioactivity by high energy atomic bombardment were reported to the meeting of the American Physical Society from the laboratories of the host institution, the University of California, Berkeley, Calif.

Eight different chemical elements, ranging from sodium and chlorine, found in common table salt, to rare platinum and deadly arsenic, give off piercing radiation like that from radium, according to papers presented by investigators working in the laboratory of Prof. E. O. Lawrence. Tool of accomplishment for the many researches was the giant 85-ton cyclotron magnetic accelerator apparatus, invented and developed by Prof. Lawrence.

The investigators not only have the immediate purpose of telling how atoms are put together but hold the hope of realizing some cheap yet effective substitute for costly radium in the treatment of cancer and its allied diseases.

Gamma radiation, the type of rays used in cancer hospitals, was reported by J. R. Richardson as being given off from sodium, chlorine and aluminum with energies as high as 3,400,000 volts.

Platinum became radioactive under deuteron bombardment, said Dr. J. M. Cork and Prof. Lawrence, and yielded radiation having energy of 4,500,000 volts. H. G. Paxton described experiments with radioactive phosphorus hav-

ing a half life period of over 50 hours. Comparable experiments with zinc discussed by Dr. J. J. Livingood yielded artificial radioactivity having a half life of as much as 100 hours.

Most artificially radioactive elements retain their activity for only a few minutes at the most. The search, thinking of possible biological and medical applications, has been to find substances which would be active for longer periods. Radium, by comparison, has a half life of 1,600 years and, although costly, wears out, by disintegration, very slowly. The new reports on artificial activity lasting as long as five days are encouraging.

*Science News Letter, December 28, 1935*

GENERAL SCIENCE

### Research Provides Defense Witness for Machinery

**I**N PLAYS, talkies, impassioned oratory and writings of all political hues, machinery is sometimes shown as a monster, forcing men out of jobs; and science, mother of machinery, shares her progeny's wicked reputation.

As defense witness for machinery, the National Industrial Conference Board presents a new study on machinery, employment and purchasing power. It combats the idea that the use of machinery in production leads to permanent displacement of labor and reduction of the

total employment opportunities of our population. Says the study:

"During the period of its most rapid introduction, from 1879 to 1929, machinery has been responsible for the establishment of many new industries; it has created new opportunities for employment; it has released workers from industries producing goods to trade and service occupations; it has stabilized employment by increasing the proportion of the gainful population engaged in trade and service industries; it has made possible an enormous increase in the total volume of production by increasing the output per man; it has reduced hours of work and child labor. In general, the use of machinery has been the chief cause of the great improvement that has occurred in the purchasing power and the standard of living of the masses of the people.

"From 1929 to 1935 the general contraction in business activity was accompanied by an even more severe decline in the production of machinery and machine tools. The increase of the output per man which took place during the years of the depression was not so much due to the introduction of machinery and technological improvements as to the great efficiency of the working forces and drastic economies introduced by management all along the line of production and distribution. Unemployment during the business depression was not due to the fact that goods were being produced by machines instead of by men, but to the fact that goods were not being produced in sufficient volume. The answer to the problem of unemployment does not lie in placing restrictions on the use of machinery but in increasing the volume of production, which would increase the purchasing power of the people and lead to full re-employment."

*Science News Letter, December 28, 1935*

A census of the Soviet Union is planned for December, 1936.

## ● RADIO

Tuesday, December 31, 1:30 p. m., E.S.T.  
SCIENCE OF 1935—A review of this year's achievements and brief forecasts for 1936 by several scientists.

Tuesday, January 7, 4:30 p. m., E.S.T.  
EXPLORING THE SEA — Commander Richard R. Lukens, U. S. Coast and Geodetic Survey.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.