PHYSICS

One Followed by 110 Ciphers—Largest Real-Meaning Number

Annual Meetings of Scientists Held Holiday Week; Radiation Equal to $5,000,000 Radium Produced

More than 6,000,000 scientific words, in over 3,000 technical papers, were given before some hundred scientific societies meeting in ten different cities this week. Holiday time is reporting and talking and discussing time for scientists. SCIENCE NEWS LETTER *in this issue brings you highlights of the early days of these meetings.*

ASK a small boy what is the largest number that has any real meaning and he may answer 100, thinking of lollypops. A business man, thinking of dollars, might say a 1,000 trillion. But the answer is 100,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000. Or the figure 1 followed by 110 ciphers.

Authority for the world's largest physically-real number is Dr. Karl T. Compton, president of Massachusetts Institute of Technology. It was put forth in his address as retiring president of the American Association for the Advancement of Science. The number represents the number of those smallest things in the universe (the electrons) which could be packed side by side into the largest volume so far measured (the limits of the present known universe).

Speaking on "The Electron: Its Intellectual and Social Significance," Dr. Compton warned that "progress comes not by revolution or discarding of past knowledge and experience, but is built upon past experience and is its natural extension once the vision from new vantage points is secured."

For those people who scoff at the academic endeavors of research in pure science and urge more practical research in the sense of securing immediate results, he said:

"There is nothing so practical in its values as accurate knowledge, and the pursuit of such knowledge has been most successful when not fettered with the initial demand that it be directed toward practical ends."

Worth $5,000,000

For people who urge more practical scientific research and bemoan the apparently wasted ingenuity of those scientists who probe the hearts of atoms, it may come as a shock to learn that just one single machine for atomic bombardment creates rays that could only be rivaled by 125 grams of rare radium. And 125 grams of radium has a value of about $5,000,000 at current prices of around $40,000 a gram.

The machine is the cyclotron apparatus in the radiation laboratory of the University of California and while the cost of building it has never been turned into an accountant's cost sheet the price is probably well under $100,000. Thus as a radiation source the machine turned in a 50-to-one investment.

Dr. Paul C. Aebersold, of the University of California, told the American Physical Society how the cyclotron apparatus is driving high speed deuterons against beryllium targets and creating the piercing particles known as neutrons. The biological effects of these neutron beams are now under investigation. To produce the same biological effect with gamma rays, from 50 to 125 grams of radium would be required.

So effective is the production of neutrons from the bombarded beryllium that 10,000 grams of radium would be needed to be mixed directly with the beryllium to obtain the same yield.

Dr. Aebersold's report was only one of many on a special program on radiological physics arranged by Dr. Lauriston S. Taylor of the National Bureau of Standards in Washington to bring together the key scientists of the nation who are working in this borderline field between medicine and physics. Conquering diseases like cancer by treating them with radiation from X-rays and radium is only one of the aims of this unique field of science.

Where a few years ago a 100,000 or 200,000 volt X-ray tube was something of which a hospital might well be proud, today larger and larger X-ray units are being installed. Already, said Dr. Taylor, there are over forty X-ray treatment installations in the United States using more than 300,000 volt X-ray tubes and most of these operate at above 400,000 volts potential.

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SWAMP BUGGY

Roaming the swamps of the Bayou Lafourche, La., is the oil-searching marsh "buggy" which runs equally well on concrete highways, dry land, boggy swamps and open water. As a land vehicle it has state license plates but it is also licensed as a class 1 motor boat and carries running lights, anchor, life preserver and two sets of pilot rules. The giant wheels are 10 feet in diameter and the tires are 33 inches thick. Designed for oil-prospecting by the Gulf Oil Company, the queer vehicle is guided by compass and carries short wave radio.

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