PHYSICS

Fast-Moving Positive Particles Produce New Kind of X-Rays

But Positive Ions Driven By Million Volts Yield Radiation Comparable Only With 10,000-Volt Negative X-Rays

POSITIVE X-rays can now be produced at a million volts instead of the few thousand necessary for ordinary or "negative" X-rays.

Positive X-rays are produced in a vacuum by the impact of positively charged ions, or atoms that have lost an electron, on a metal target; whereas negative X-rays, found by Roengten in 1895, are produced by fast electrons.

Dr. W. M. Coates and Prof. E. O. Lawrence of the University of California have stepped up mercury positive ions to 1,000,000 volts and on allowing them to strike targets of various elements have observed that real X-rays are given off.

Ever since Roengten's original discovery of the common "negative" X-ray that has played such an important part in modern medicine, physicists have been attempting to produce these rays by positive as well as negative projectiles. Sir J. J. Thomson, as early as 1914, observed a non-penetrating radiation from targets struck by protons or hydrogen positive ions, but the very softness or lack of penetrating power of the radiation proved that this was not a positive X-ray.

Even Drs. J. D. Cockcroft and E. T. S. Walton of Cambridge University, the pioneers in nuclear disintegration by high velocity protons, found no appreciable quantity of this positive X-radiation at projectile speeds equivalent to 700,000 volts. It remained for F. L. Verwiebe of the University of Chicago to settle the question as to the exact nature of the Thomson radiation resulting from proton bombardment.

At energies up to 50,000 volts he found that the hardest radiation given off was not due to the metal being used as a target but to the changes in the bullets themselves at the time of the impact. This is to be contrasted with the effects of Drs. Coates and Lawrence where the radiation has without doubt the same penetrating power as our ordinary X-rays, and where, from targets of the lighter elements the rays are characteristic of the targets, a true X-ray effect. However, for the heavier targets it is again the bullet itself that breaks up.

At present there are no prospects of utilizing this new method to produce better or cheaper X-rays. The process is remarkably inefficient as a million volt positive ion will produce only approximately the same quantity of X-rays as a ten thousand volt electron.

The scientific solution of the old problem as to the previous non-existence of positive X-rays is twofold: higher voltages and heavier projectiles.

Science News Letter, August 12, 1933

ANTHROPOLOGY

Exposition Visitors Examined For New Racial Type

HAS A NEW racial type been smelted into being out of the quality, mediocrity and dross poured into the American melting pot?

This is the question that visitors from all parts of the United States are helping the Harvard anthropometric laboratory answer at its station on the grounds of the Century of Progress Exposition.

As the visitors file through the station, in charge of C. Wesley Dupertuis, more than ninety measurements and observations of physical characteristics are made. Thus a cross section of American racial types is being charted which is expected to determine for the first time whether there is a distinct American racial type and, if so, what its characteristics are.

From data already taken it appears that Americans are revealing a common racial type which is becoming more and more round-headed instead of Nordic long-headed.

Science News Letter, August 12, 1933

MELTING POT TEST

CHEMISTRY

Blast Furnace Gets Phosphorus Cheaply From Tennessee Rock

PHOSPHORIC acid of a higher purity than ever obtained before can now be produced economically in large quantities by means of a process perfected by Henry W. Easterwood, chemical engineer, and his associates. This acid, indispensable in the manufacture of certain fertilizers, foods, and drugs, is obtained from phosphate rock which occurs in large quantities in Tennessee.

Although it has been the desire of chemical engineers for sixty-five years to be able to manufacture phosphoric acid cheaply, it remained for Mr. Easterwood and his associates successfully to adapt the blast furnace principle to the problem and make the dream a reality. As a result a furnace capable of producing 250,000 pounds of phosphorus pentoxide per day, which is converted