

come the "X" particles. The great mass of these secondary particles permits them to penetrate deeper than the initial particles and they are found to produce most of the cosmic effects found at sea level and low altitudes.

The new intermediate-weight particles, Dr. Langer reports, would account well for the cosmic ray effects noted in high altitude experiments on mountain tops, in airplanes and in sounding balloons.

It is not necessary to postulate new particles with special behavior to explain existing observations, as has been suggested by other investigators, says Dr. Langer.

He favors the hypothesis put forward by Dr. Seth Neddermeyer of California Institute of Technology, that there can exist a whole series of masses for the electron which differ by unity. Thus it would be possible to have electronic masses just as there is a whole series of chemical elements with masses differing by unity from hydrogen, at mass one, up to uranium with mass 240. In the field of the chemical elements only the form with mass 5 is missing out of all this series.

The still-unfound electrons with masses up to 10 times that of the ordinary electron, plus the very heavy electrons already observed, would provide the first successful explanation of the way cosmic radiation increases in intensity as one goes higher up in the atmosphere, claims Dr. Langer.

Science News Letter, April 2, 1938

METALLURGY

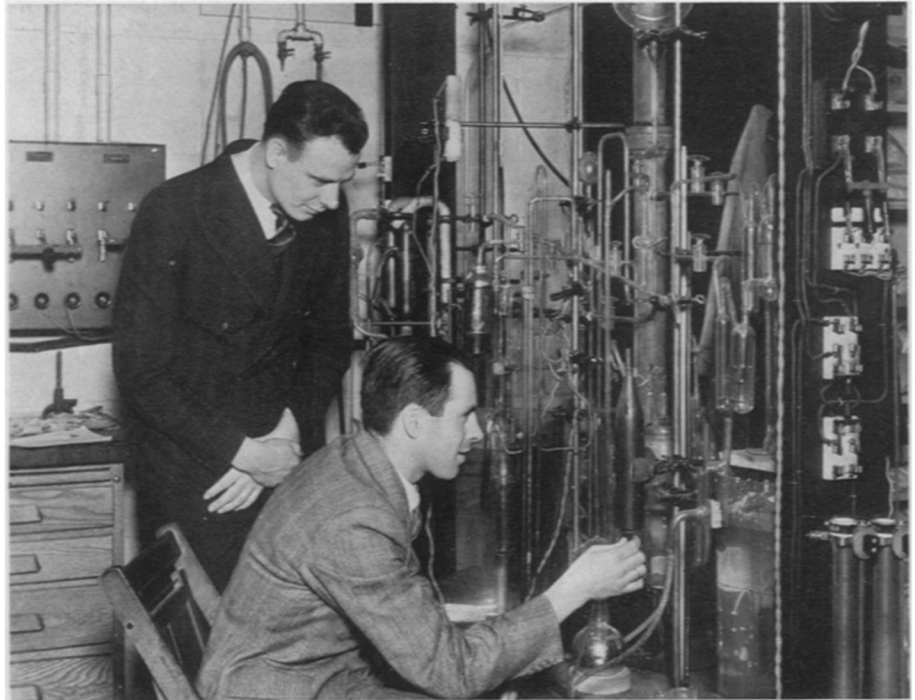
No Substitute Known For Metallurgical Coke

NOTHING now known can be substituted for metallurgical coke, despite the growing use of fuel oils and natural gas, reports Dr. Arno C. Fieldner, U. S. Bureau of Mines fuel expert, reviewing the state of the fuel industry in an address at the University of Maryland.

Coal, once supplying 89 per cent. of the country's fuel energy, and now giving 50 per cent., will in the future again supply most of our fuel energy, says Dr. Fieldner, for our coal reserves greatly exceed our petroleum reserves.

Gasoline from coal, ingenious though the Bergius and Fischer processes are, says Dr. Fieldner, is thermally inefficient, requiring four tons of coal to make one ton of gasoline. Thus, gasoline should not be made from coal until all natural supplies of petroleum are exhausted.

Science News Letter, April 2, 1938



FINDING EARTH'S AGE

Measurements of the amount of radium-derived helium in the rocks tell how old the rocks are, according to present geological theories. This complicated chemical apparatus, operated by Drs. William D. Urry (seated) and Charles S. Keevil (standing) is used in the extraction and measurement of helium from rocks.

GEOPHYSICS

Radium in Meteorites Helps Fix Age of Cosmic Visitors

EXPLODING atoms of radium, giving off helium, lead and energy, now tell scientists the ages of many meteorites which wandered into the earth's gravitational field, later crashing to earth with fiery brilliance.

Some of them, according to figures recently published by Dr. Wm. D. Urry, Massachusetts Institute of Technology physical chemist, who has been analyzing rocks for many years to determine their ages, are less than 100,000,000 years old, while others are as much as 2,800,000,000 years old—about as old as the solar system.

Dr. Urry's analyses, painstakingly made from samples of the meteorite, tell the age of its solidification, and not the time when it fell. Thus, some of these wanderers from space were molten during the age of dinosaurs on earth, while others solidified just as the solar system was being formed.

The oldest meteorites, according to

Dr. Urry's figures, could truly be "chips from creation" left over from the great mass of material pulled from the sun when the planets were formed. Others, unless they stayed melted for more than two billion years in the bitter cold of space, could not be leftovers. They must have been formed some other way.

Until recently, it was believed that meteorites were remains of a small planet, or group of planets, whose orbits were beyond Mars. This planet, on breaking up, created the meteorites. Now, with the ages of the meteorites shown to be different, the theory of a disrupted planet may need to be revised.

Many of the stony meteorites show evidence of having been broken and re-cemented, while others have undergone other alterations just as a rock on earth might in the course of its history. All of the rocks, however, are of the primary type—they were molten once, but none of them resemble earthly sedi-



RECENT VISITOR

This iron fragment from the Canyon Diablo meteorite, which crashed to earth in geologically recent time, and was probably seen to fall by Indians, is about 100,000,000 years old, according to evidence given by the radium, helium and lead it contains.

ments, such as sandstone or shale. The iron meteorites resemble the earth's interior as it has been described by geophysicists, whose instruments tell them facts about places they will never see.

Comets, when they cool and compact into large masses from clouds of luminous dust, are the source of meteorites, according to another theory. Some geologists believe that meteorites do not come from the solar system at all, but that they are wanderers from outer space, attracted into the solar system by the sun's pull, and only incidentally pulled to earth. The new age figures do not solve the riddle of the meteorites, but only show that they are of widely differing ages.

Science News Letter, April 2, 1938

PUBLIC HEALTH

Urges Useful Employment As Mental Health Measure

USEFUL employment—with emphasis on the useful—for all who are able and willing to work was urged as a public health measure by Surgeon General Thomas Parran of the U. S. Public Health Service.

Speaking "as a doctor" before a Senate committee to investigate unemployment and relief, Dr. Parran said:

"Whatever the cost, I would urge that from the standpoint of public health, in its larger concept—of mental health—economic factors are subordinate to the vital necessity of providing for our destitute citizens an opportunity of a livelihood earned by individual effort.

"We cannot for long years and perhaps generations repair losses to human character and mental health which will result from a failure to give useful employment to our citizens."

The vicious circle of poverty-disease-poverty can best be broken, Dr. Parran said, "by doing what we know how to do to improve the health of the underprivileged groups."

He cited figures from the recent Public Health Service survey showing that there is much more illness among the unemployed and much less medical care than among those in more comfortable economic circumstances, and that disease is a large factor in unemployment and unemployability.

Unemployment and economic worry were among the factors causing mental illness and breakdown in as high as one-fourth of first admissions to mental disease hospitals during depression years,

according to hospital superintendents' estimates.

Illness and death due to tuberculosis, syphilis, pneumonia and cancer could be greatly reduced, Dr. Parran said, by applying present knowledge to all classes of the population.

Death rates from tuberculosis among the unemployed are now as high as they were for the entire population in 1900. The reduction in the general tuberculosis death rate during the years since 1900 hides the high death rate among lower economic groups.

Science News Letter, April 2, 1938

PUBLIC HEALTH

Peak of Measles Epidemic Not Due For Three Weeks

THE MEASLES epidemic slacked off a bit during the week ending March 19, figures just received at the U. S. Public Health Service show. For this last week the total number of cases, exclusive of Iowa which has not yet reported, was 43,489. This is about 300 cases less than the previous week.

Health authorities do not think the peak of the epidemic has been reached yet, however. Charts of measles reports for the past 9 years show that the totals go up to a high point, then drop slightly for a week and then rise again to the final peak. Only exception to this in 9 years was in 1935 when the peak was reached on March 30. Other peaks usually come about the middle or end of April, after which the epidemic dies out.

That peak week of March 30, 1935, saw the largest number of cases ever reported for a single week, over 35,000.

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LOST ARTS OF THE STONE AGE—Dr.
H. C. Shetrone, Director of the Ohio
State Museum.

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