

Elements Can Be Transmuted

Dream of Scientists for a Thousand Years Achieved by Dr. Rutherford.

FAR - REACHING POSSIBILITIES

Remarkable Result of Bombarding Nitrogen Gas With the Alpha Rays of Radium - May Supply Unlimited Power.

New York.—The transmutation of elements, the dream of both charlatans and scientists for nearly a thousand years, has actually been accomplished by the recent work of Sir Ernest Rutherford, and his results are generally accepted by scientists and physicists, according to Dr. James Kendall, associate professor of chemistry at Columbia, who said, on the other hand, that there was not the slightest reason to believe that the Germans had accomplished their reported feat of making synthetic gold. Nitrogen, sodium, aluminum, chlorine, oxygen and carbon have been transmuted, or broken up by Rutherford into hydrogen and helium, according to Dr. Kendall.

This was first accomplished, according to the claims of Rutherford, by bombarding nitrogen gas with the alpha rays of radium. These so-called rays are helium atoms which are flung out of the exploding radium atom with an energy incomparably greater than any projectile produced artificially. The velocity of this atom would take it around the world in slightly less than a second, and the power of the exploding atom, in proportion to size, is something like a million times greater than that of trinitrotoluol.

Result of a Chemical Collision.

The radium was placed so as to drive the alpha particles into nitrogen gas. When the alpha particle had a head-on collision with a nitrogen atom it tore it to pieces, so it is asserted. The atom supposedly has a structure somewhat resembling the solar system. Its center is a nucleus of positive electricity, resembling the sun of the solar system, and this is surrounded by electrons, or charges of negative electricity, presumably whirling about the nucleus, as the planets whirl about the sun.

The alpha particle is believed to produce such a disruption in the atom as might occur, for instance, if another star of the dimensions of the sun tore through our system, hit the sun directly and drove it off into space, causing the planets to shoot off in all directions.

This occurs on a scale in the neighborhood of the billionth part of a billionth of an inch, but it can be partly measured. The alpha particles thrown off by radium produce scintillations when they strike a screen of zinc sulphide within a certain distance. When they were used to bombard nitrogen scintillations took place at greater distances from the radium than the alpha particle could alone produce.

By his study of these scintillations Dr. Rutherford was able to prove to the satisfaction of men of science generally that new products were developed by the shattering of the nitrogen atoms and that these products were hydrogen and helium atoms. His experiments have all been in the way of disorganizing the more complex atoms into simpler ones. The transmutation of atoms with simple structures into those with more complex ones has not been achieved.

Dr. Kendall on Rutherford. "Rutherford has reduced nitrogen, aluminum, chlorine and sodium to hydrogen and helium," said Dr. Kendall. "He has also produced helium atoms by tearing oxygen and carbon to pieces, but hydrogen has not re-

sulted, I believe, from the disruption of these atoms.

"This is certainly the transmutation of elements, but it is done on an infinitely small scale, and is important at present only to the scientific man. It does not promise that elements can be changed from one type to another, except on the smallest laboratory scale. It does not suggest that the transmutation of metals may be developed from it."

The possible far-reaching results of Rutherford's discovery were discussed as follows by Professor O. W. Richardson in his recent presidential address to the Section of Mathematics and Physics of the British association:

"Rutherford has taken the direct method of bombarding the nuclei of the different atoms with the equally minute high-velocity helium nuclei (alpha particles) given off by radioactive substances, and examining the tracks of any other particles which may be generated as a result of the impact.

The amounts of energy which have been thus far released by artificial disintegration of the nuclei are themselves small, but they are enormous in comparison with the minute amount of matter affected.

"If these effects can be sufficiently intensified there appears to be two possibilities. Either they will prove uncontrollable, which would presumably spell the end of all things, or they will not. If they can be both in-

Learns Secret of Arrow Heads

Illinois Man Gets Credit as Only Man Who Knows How to Make Them.

INDIAN CHIEFS LOSE TRICK

Many of Them Confess Their Ignorance of Just How to Make Arrow Heads—Are Identified by Tribal Marks.

Springfield.—Making of Indian arrow heads has been reduced to its first principles here by Herbert Wells Fay, custodian of the Lincoln monument, who has gained the distinction, which it is said until now has been undisputed, of being the only white man to make real arrow heads.

Indians are among the foremost in crediting Mr. Fay with this ability. Drawn to the last resting place of Abraham Lincoln, various present-day Indian chiefs have openly confessed their ignorance of "just how" to make arrow heads, and then have voiced their surprise at the excellent workmanship of the white man.

Finding that his arrows have been taken for the work of real Indians, Mr. Fay no longer makes arrows of flint, but to prevent fraud uses only glass.

Worked Near Dekalb.
His study of arrow heads was gained largely near his former home at Dekalb, in which vicinity, he said, there had been seven Indian camps.

Mr. Fay takes issue with other authorities who say arrow heads may be identified by their shape as the work of a particular tribe. Years of study and the actual making of arrows prove otherwise, Mr. Fay declares.

His conclusions as to arrow-making are outlined as follows: "Indians first tried stones that break with a conchoidal fracture (like the inside of a

ITALY'S WARM FRIEND



Mrs. John A. Drake of New York recently received a letter from Pope Benedict XV in which his holiness bestowed upon her his apostolic blessing for the work which she has done as head of the American Free Milk and Relief for Italy, Inc. She is wearing the many medals bestowed upon her in Italy.

intensified and controlled, then we shall have at our disposal an almost limitless supply of power which will entirely transcend anything hitherto known."

CORNHUSKER ITEMS

News of All Kinds Gathered From Various Points Throughout Nebraska.

The supreme court decided that the city of Nebraska City is entitled to the exclusive use of its 46-acre park, the Nebraska City Speed and Fair association being ousted therefrom by the terms of the opinion. The city through its officials, in 1908 leased thirty acres in consideration of the latter constructing and maintaining a race track. The association was to have exclusive control of the grounds during the meets and the fairs. Some time ago the city brought suit to regain possession of the ground, alleging that the contract was illegal and one which could not be lawfully entered into by the municipality. The defendant claimed that the city was estopped from challenging the validity of its own contract but the court finds otherwise. The high bench says the city had no right to grant concessions in a public park without reserving to its officers supervision over the same.

A census of all ex-service men in the state, with a view to ascertaining the number of disabled and unemployed veterans and then procuring aid for one and jobs for the other, will be undertaken by the Nebraska department of the American Legion between February 12 and 22. Announcement was made by State Commander "Bill" Ritchie, at a meeting of post officers. The census will be made through local posts. The period between February 12 to '22 has been designated by the legion as "Respect the Flag" week, and Commander Ritchie announced that every post would be asked to secure co-operation of schools and patriotic organizations to that end.

Robbers made a clean sweep of dental offices at Norfolk, netting about \$1,000 in cash and gold. Several safes were broken open. The offices were located in four separate buildings, the entrances of which were conspicuously marked with chalk crosses, indicating preliminary plans of what police say was an organized band.

Shelton has organized an indoor baseball association and has eight teams in the league. The games are staged in the hall of the American legion headquarters and the players are business men, professional men, high school students and boys. More than 100 men, young men and boys have joined the association.

D. D. Rowe, Fremont has been elected president of the Nebraska Building and Loan to relieve T. L. Matthews, who retires from active service as the head of the organization after thirty years. The new president joined the organization about twenty years ago, taking the job of janitor, clerk and stenographer.

William Stober, 60, of near Norfolk, lost in the terrific snow storm for seven hours, was found by a searching party after he had crossed the North Fork river in search of his home. His hands were frozen and he is in a serious condition.

The county campaign for Near East relief has resulted in three car loads of corn contributed to the cause by citizens of Nuckolls county. Local committees have been named in each town in the county and the collecting will be continued.

William Ritze, 25, farmer, of Wayne, drove his automobile to West Point, on November 6 last. He left his car in a garage in West Point and has not been seen or heard from since. His father, Richard Ritze, will pay \$100 for information as to his whereabouts.

Bryan Berry, 13, of Lincoln, died from injuries received when he was run over by a coal wagon. His face was crushed and he suffered internal injuries.

Paving bonds of the Village of Clarks have been sold and the work on the paving will be commenced as soon as weather will permit.

A four-inch vein of coal was discovered on a farm east of Butte. It is not known if the fuel is present in paying quantity.

Dunbar is enjoying electric lights with current furnished by the Nebraska City water and light company.

A large stock pavilion in which sales of thoroughbred stock will be held, is being erected at Minden.

Last year's auto licenses will provoke arrests in Jefferson county. County officials have decreed that plenty of time has elapsed for equipping machines with new numbers. There are 3,200 cars in the county; 2,000 have new licenses.

Lyle Johnson, 12, of Lincoln, had a narrow escape from death when a piece of butterscotch candy became lodged in his throat while he was attending a movie. City Physician W. H. Slattery extracted the candy just in time to save the lad from choking to death.

Closing of the Farmers' State bank at Bayard, by the state department of trade and commerce was necessitated directly by shrinkage of deposits from \$225,000 to \$150,000 in less than a month. Secretary J. E. Hart announced Examiner G. S. Eastman is now in Nebraska's proposed new state capitol can be built for 3 per cent less than 1915 costs, State Engineer Johnson reported at a meeting of the capitol commission with a house committee. Committee is considering whether it will be expedient to delay building.

spoon). They found that the deeper the break at the top of the flat-surfaced stone the longer would be the break in the stone, but it would be correspondingly wide. They wished, however, a long, narrow piece as more suitable for an arrow head.

"They then found that by breaking the stone at a corner they could produce such a 'flake' (raw arrow head), one, two, or even five times its width, according to the skill of the artisan. Such an arrow head always has a ridge on one side and the other side smooth. The ridge is the corner of the stone from which the flake was broken.

"Next, the Indian found that in finishing the arrow head, if the stone breaks easier from one direction on the top, it would break just as easily, from the other on the bottom. This gave rise to the belief that arrow heads were made to revolve. Such was not the intention of arrow makers, as the same natural peculiarity appears in spear heads, which are too heavy to revolve, as spears were seldom expected to go more than a few times their length.

"These principles being true of all stone used by the Indians, it is an evident impossibility for any collector to tell what tribe made certain arrow or spear heads. The width, depth and thickness, determined by the depth of the fracture of the stone, determine the shape and appearance of the finished product."

Chert Center in Illinois.
Most of the arrow heads of the north Mississippi valley, Mr. Fay said, were made of chert, a chalky flint, taken from the quarries in Union county, Illinois, near Cairo. The bluffs at that place along the Mississippi river show outcroppings of this chert and prolific evidences of the activity of Indians, who went there from all parts of Illinois, Indiana, Iowa and Wisconsin, he added.

"Less than 1 per cent of the arrow heads found in this wide territory," Mr. Fay continued, "seem to have been made from local stone. The Union county quarries have been determined as the principal source because arrows found throughout that region corresponded exactly to the quality of the Union county stone. It is not known whether expert 'flake' makers held the quarries in Union county and distributed material to tribes as they came down, or whether each tribe had its flake makers and visited the quarries periodically.

Implements used by Indians in making arrow heads, according to Mr. Fay, were made with one tool, a piece of bone somewhat like the handle of a toothbrush.

WILL BAN GRADE CROSSINGS

United States Will Construct Bridges or Underpasses on Federal Highways.

Washington.—Grade crossings will be eliminated wherever possible and replaced with bridges or underpasses on all roads of the federal aid highway system to be constructed under the federal highway act, the bureau of public roads of the Department of Agriculture announces.

Important roads, many of which at present cross and recross railroads at grades, hereafter will be built entirely on one side of the railroad.

In the three years ending with 1920, according to records available to the bureau, 3,036 lives were lost and 10,644 persons were injured at grade crossings in the United States.

Wireless Phones for Commuters



Chicagoans who reside in the suburbs may soon find their homes equipped with the wireless telephone so that they can talk with their homes while going to or coming from the city, and can even enjoy grand opera in the evening. The system was tried out recently, and the photograph shows a passenger using the radio phone on a car.

LAND GROWS RICH

Wonderful Development of Canada in Forty Years.

Four Decades Ago Little Considered, Today One of the Greatest Granaries and Dairying Centers.

The recent announcement that the sale of the first section of Canadian Pacific land was sold forty years ago, and when you read that the first carload of wheat was shipped from Winnipeg forty years ago, the changes that have taken place since then are matters of reminiscence, but yet of interest. What forty years ago was an unknown quantity, barren because but little production was attempted, is today one of the greatest granaries in the world. Then there was scarcely any farm live stock in the West. Dairying was not engaged in at all. Today there are 6,998,317 farm animals on the prairies, of which 881,899 are milch cows; and dairying is only second in importance to grain growing, in the West.

Forty years ago the shipment of one carload of grain was a notable exploit.

Today, Canada ranks as the second largest wheat-producing country in the world, with 320,185,300 bushels, 90 per cent of which was grown in the three prairie provinces, of which the province of Saskatchewan produced more than half. The Dominion is today the second largest producer of oats, with 530,710,000 bushels, of which 60 per cent was grown between Winnipeg and the Rocky mountains; and the fifth largest producer of barley with 63,311,000 bushels, of which the prairies yielded 65 per cent.

Forty years ago scarcely any of the rich soil had been brought under cultivation. The farm machinery of the time was crude; there were no competent advisers; government experimental farms were a blessing that came years later.

Yet these hardy pioneers stuck it out, and in forty years numbers of them are enjoying their declining days in the communities they wrested from the wilderness, prosperous, contented, with their children's families gathered about them or seeking their own fortunes still further westward or northward. They have seen civilization step in to the West and the wilderness swept out. Today are thriving cities and towns where bleaching buffalo bones marked the ox trails of forty years ago. Today are mighty freight trains, each with its thousand-ton cargo of wheat or merchandise, roaring down the roads where the old curbs creaked. Today are schools within walking distance of every farmhouse, churches within driving distance of every home. Today are telephones and every modern convenience linking communities over vast distances by the common bond of the spoken word.

Forty years ago the Rockies were practically an impenetrable barrier, the Pacific coast being reached from the east by ships sailing round Cape Horn. The province of Manitoba had a population of 62,290, compared with 613,008 in 1921. Winnipeg was then a frontier town with 7,987 people, and Brandon, which was regarded as a far-flung outpost of the West, boasted of a few hundred in population. In 1891 it only had 3,778. Such places as Calgary and Edmonton were mercantile trading posts in the Northwest territories. Buffalo roamed the prairie in their native state.

Today on these plains are to be seen herds of cattle, bands of horses and droves of sheep, from any of which can easily be selected stock that can carry off premiums, sweepstakes and championships in competition with the best in any other part of the world.—Advertisement.

All He Asked.
Old Crusty—You ask for my daughter? Why, young man, at your present salary you could not even dress her.
Sailor—Oh, yes, sir! I could keep her in gloves.
Old Crusty—Gloves! Do you mean to insinuate that my daughter would wear only gloves?
Sailor—Pardon me, sir; I asked only for her hand.

DYED HER BABY'S COAT, A SKIRT AND CURTAINS WITH "DIAMOND DYES"

Each package of "Diamond Dyes" contains directions so simple any woman can dye or tint her old, worn, faded things new. Even if she has never dyed before, she can put a new, rich color into shabby skirts, dresses, waists, coats, stockings, sweaters, coverings, draperies, hangings, everything. Buy Diamond Dyes—no other kind—then perfect home dyeing is guaranteed. Just tell your druggist whether the material you wish to dye is wool or silk, or whether it is linen, cotton, or mixed goods. Diamond Dyes never streak, spot, fade or run.—advertisement.

Naturally.
"What did Mrs. Horner say after her maid-of-all-work departed?"
"Help! Help!"—Wayside Tales.

Important to Mothers
Examine carefully every bottle of CASTORIA, that famous old remedy for infants and children, and see that it Bears the Signature of *Chas. H. Fletcher* In Use For Over 30 Years. Children Cry for Fletcher's Castoria

How Now?
Following the birth notices in a paper there is a line: "Our Ads Bring Results."—Exchange