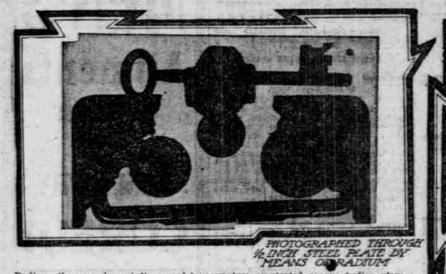
MOST WONDERFUL SUBSTANCE ON EARTH

Radium, Baffling Science With Its Power, Upsets All Theories of Nature's Laws



Radium-the new element discovered by uranium penetrated opaque bodies-glass Madame Curic, of Pario-is the most mar-metals and other substances.

Madame Curle, of Paris-is the most mar-velous substance in the world. It supplies heat, light and energy in a continuous stream, and yet loses none of its own power by waste. Up to this time, all the most famous scientists in the world -including Lord Kelvin, the English Edi-son, and Sir William Crooken, of X-ray fame-have been unable to account for its source of power. A pound of radium in a room 15 feet long

A pound of radium in a room 15 feet long 18 feet square would heat and light by is feet square would next and ight aname Curie found that the saits of the room, and run a lot of machinery for ages without the slightest diminution of force, efficiency or weight. It has its drawbacks, however, for a

pound of the substance in the size room ed would shrivel up all the living ntlor things* with which its wonderful rays came in contact.

All other substances are as air to radium rays. It penetrates steel, lead, mercury, tin, copper, zinc and iron as if they were so much mosquito netting. If you sit in a dark room, bindfoldsd and with your head inside a leaden box, the rays of radium will be seen through all the thickness of the box, the blind-fold, and even the closed eyelids.

Can Photograph Through Steel. If you carry a tenth of a grain of radlum in your pocket for a week, your skin will be blistered through your clothing,

even should the substance be encased in a copper tube, and surrounded by glass. Radium rays will penetrate search every known substance, and photographs can be taken with it through sheets of steel.

All the foregoing pounds very much like pipe dream from the longest "Church-arden" on earth. But it isn't. The marvels of the new substance are

so great that the flight of the wildest imfination is scarcely able to afford an idea its qualities.

Half the story of what radium will be is yet to be told. Scientists all over the world have riveted their attention on the new element, and any day might endow it with new and still more wonderful vir-

Perhaps it is just as well for the dwell-ers of this earth that so little radium is in existence. At present, it has to be extracted from pitchblende, a dark green apound found principally in the Harts untains, in Bohemia, and in Cornwall, England. It is only obtained by submitting the pitchblende to the most laborious kind of a whole processes, and then it requires ton of pitchblende to yield 15 grains of radium.

Has a Tremendous Value.

Until science knows more about radium. its production in such small guantities is perhaps an advantage rather than otherise. For, if a pound would kill every-dy in a large room, and a tenth of a alm bilister the sin, what would a few ma do if suddenly brought to the earth's

The cost of radium prohibits its use except by the wealthiest scientific inves-tigators. It is worth more than its weight

moved from it. Sir William Crookes-the inventor of the Crookes tube, and one of the most dis-tinguished chemists in the world-has tried tinguished chemists in the world-has tried a number of experiments with radium. He found that his glass beakers, test tubes and other vessels, after coming in con-tact with radium were themselves en-dowed with radium powers and emitted light when placed against a blende screen. Of course, radium rays are invisible un-der ordinary circumstances. In order

platino-cyanide of barium Great Power of the Rays.

over the world. Madame Curie found that the

luminosity after the radium has been re-

Looking at the screen, a wonderful scintillation is beheld. Radium electrons keep up a continuous bombardment against the screen which resembles the explosions of thousands of tiny meteors in the heavens at night. The points of light as they strike the screen are vivid-

ly green in color. Ordinarily, the ways from most sub-stances can be turned aside or deflected by powerful draughts of air, or by the presence of an electro-magnet. Sir Wil-liam Crookes found that no amount of electric current, and no force of air cur-rent, had the power to deflect radium rays. They kept on their course irre-spective of every attempt made to divert

them. Their velocity has been computed at the rate of about %,000 miles a second, and their activity is 100,000 times greater than uranium, which, up to the discovery of radium, was the most active substance in the world. Uranium, it might be men-tioned, is 3000 times most active than other substances; therefore, radium is 20,000 times motive fram every other 306,000 times more active than every other known substance.

Its Energy Is Endless.

In an interview on radium, Sir William Crookes, speaking of the power of the new element, said: "The energy of one gramme of radium electrons is enough to lift the whole of the British fleet to the top of the Alps." Lord Kelvin, in experimenting with the

radium with a view to ascertaining whether or not it lost energy, found that it would take more than a Milion years for a square centimeter of radium to lose

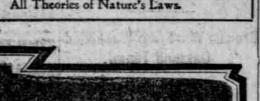


Radium, however, loses nothing. Radi-um not only emits light, but it gives off beat. The heat given off by radium is such that it will melt its own weight of

the in an hour. Where this heat comes from, or how that heat can continue after it has melt-ed the ice, science at present does not know. The advocates of perpetual mo-tion seem to have a natural confirmation

pocket can bilster the skin through file clothing, and through a copper tobe sur-rounded by glass, doubters its stimulative effect on the nervous system will be enst. mous. The optic nerve, even in persons totally blind, is sensitive to radium emamous.

Medicinally, its powers are untested; though some of the best medical men therapeutics. A Glasgow professor has suggested that if Professor Jaques Loeb



<text>

bid there under Halley, were fighting to hold the Rat Valley levels. Bucks sent Halley to ver there because he sent Halley to the headlight shot far out upon raining. Sunday it rained all through the mountains: Tuesday through the mountains: Tuesday the was raining from Omana to Essier.
Trackmen at the bridge Tuesday sight fageed Number One and reported there was the lamp lit a black and analy food sweepfing over the abutment with yellow foam. The Peace had licked up Agnews 2b-foot piles and his bridge was not.
Whatever could be done-and Halley to ake the with yellow foam. The Peace had licked up Agnews 2b-foot piles and his bridge was not.
Whatever could be done-and Halley the was mainte. All the day, the night and the next day the sulen roar of the grants. It wellow for an the grant to the scath the poiles, was not the stack water and the super and they would think of trying to supplant the wired, 'lee out,' and set back dragted again aftent, for home and for sleep. Saturday night he slept, and Sunday all day and Sunday might. Monday about mon Bucks sent up to ask, but Halley was and the sate back whether there watching, they akked back whether there alarms. The Spider wook is the day to the sale broke whether there alarms.
Tweeday morning the tall roadmaster checked heavily. The leads of the alar broke, envuing the lale pile with their alarms. The Spider work is a bridge with devis alarms.
Tweeday morning the tall roadmaster checked heavily conter cangened for an in the top pane. And the should and the mean the coadmaster checked heavily conter and five in the inter alarms. The spider work there watching, they akked back there alarms.
The sat of clock Tuesday might, and the mas 5 o'clock Tuesday might hey alarms. The pane and they answered its calling, but will be targe was the black track and the mean the caboose was killed. They show the study to alarms. The caboose was killed. They alar the office for the trackwalker's report in a bir taleven.

at the office for the trackwaikers report, and the railway weather builetina. Bucks, Calahan and Peeto sat about Duffy, who, in his shirt sjeeves, threw the stuff out off the sounder as it trickled in over the wirres. The west wire was good, but east everything below Peace River was down. We had to get the eastern reports around by Omnha and the South-a good thou-sand miles of a loop. Wild Hat came first from the West with a stationary river and the Loup Creek

a stationary river and the Loup Creek falling-clear-good night. Then from the East came Prairie Portage, all the way

East came Prairie Portage, all the way round, with a northwest rain, a rising river, and anchor ice pounding the piers badly, track in fair shape-and-and-The wire went wrong, and stuff that no man could get tumbled in like a dic-tionary upside down. Bucks and Calla-han and Hailey and Peeto smoked, silent, and listened to the deepening drum of the rain on the rouf.

ore, and the long way came word of ouble in the Omaha yards.

"Hell to pay on the Missouri, of course," growled the foreman. "Well, she don't run our way; let her bell, damn her!" "Keep still?" esclaimed Duffy, leaning heavily on the key. "Here's something-

from-the Spider." Only the hum of the rain and the ner-vous break of the sounder cut the smoke that curied from their pipes. Duffy snatched a pen and ran it across a clip, and Bucks, leaning over, read aloud from his shoulder.

"J. F. Bucks-Trainmen from No. 75 stalled weat of Rapid City; track afoat in Simpson's cut; report Spider bridge out send-"

In Sumpson's out, report spher bridge out send-" And the current broke. Callshan's hand closed rigidly over his pipe. Peeto sat speechless: Bucks read again at the broken megsage; but Halley sprang like a man wounded and snatched the clip from his superintendent's hand. He stared at the ranning words until they burnt his eyes, and then, with an oath frightful as the thunder that broke down the mountains he dashed the clip to the floor. His eyes mapped greenish with fury, and he cursed Omaha, cursed its messages and everything that came out of it. Out it came-all the rage-all the heart-burning-all the bitterness-and he dropped, bent, into a chair and covered his face with his hands. They watched him slowly knot his fingers and loosen them, and saw his face rise dry and hard and old out of his hands.

out of his hands. "Get up an engine!"

tly streaming; rocket's red glare, the hombs hursting in air. In 20 minutes 20 men were running 20

"Not-you're not going down there to-night?" stammered Bucks, "Yes. Now. Right off. Peeto! Get the j O'ar the out your crew!"

lows:

he

Feeto. Halley never called again. At daybreak wreckers of the West End, swarming from mountain and plain, were heading for the Peace, and the McCloud heading for the Peace, and the McCload gaug-up-crossed the Spider on Hailey's bridge-on the bridge the cowarditrainmen had reported out, quaking as they did in the storm at the Spider foaming over its approaches. But Hailey's bridge stood--stands today. Yet three days the Spider raged, and knew then its master, while he three whole days set at the bottom of the Peace clutching the carging levers in the rules

clutching the engine levers in the ru

FAMILIAR SONGS AND

THEIR AUTHORS

Francis Scott Key was born in Frederick

County, Maryland, August 9, 1780, and died

ler by profession and District Attorney for the District of Columbia when the

British invaded Washington, in 1814. When out under orders from President Madison

on board of an enemy's ship witnessed the bombardment of Fort McHenry, which

defended Baltimore. He with other pris-

oners watched anxiously to see which flag floated on the fort. Key's feelings on see-

poem which gained for him a lasting repu-

tation. He wrote part of it on the ship and the rest on his arrival at Baltimore, where it was goon after song at his sug-gestion to the tune of "Anacreon in Heaven." Key wrote a number of other

songs, a collection of them appearing in 1557. A \$50,000 monument was erected to Kay in Golden Gate Park, San Francesco, by James Lick. The words of the song which carries his name along are as fol-

Oh, say, can you see by the dawn's early light. What so proudly we halled, at the twilight's last gleaning. Whose bread stripes and bright stars, through

On that shore, dimly seen through the mists

of the decy, Where the foe's haughty host in dread sl-lence reposes, What is that which the breeze, o'er the tow-ering steep, As it fituily blows, new conceals, now dis-

closes? Now it catches the gleam of the morning's first beam, In full glory reflected now shines in the

"Tis the Star-Spangled Banner; oh, long may

It wave O'er the land of the free and the home of the brave.

And where are the foes who so vauntingly

That the havoe of war, and the battle's confusion, A home and a country should leave us no

was captured by the British, and while

Baltimore, June 11, 1842. He was a law-

of Agnew's mistake. And when the divers got them up Calla-han and Bucks tore hig Peeto's arms from his master's body and shut his staring eyes and laid him at his master's side. And only the Spider ravening at Hafley's caissons raged. But Halley slept. (Copyright, 1963.) rain on the roof. Then Duffy wrestled mightily yet once

from-the Spider.'

ing that the Stars and Stripes had not been hauled down found expression in the

and, by placing radium in the street lamps | the discovery of radium is leading to the

perilous fight, be ramparts we watched, were so gal-And the

Gave proof through the night that our dag Oh, say, does that Star-Spangled Banner yet ware O'er the land of the free and the home of the brave?

PIECE OF RADITIM WORTH \$ 1000 ON AN ENGLISH SIXPENSE der ordinary circumstances. In order to see them one must be in a totaliy dark room. The radium is placed near a card-board screen the surface of which has been coated either with sinc-sulphide or

about it is that scientific men seem to admit that its possibilities are almost unthinkable.- Usually, scientists are very prompt in "calling down" the mere im-aginative dreamer.

Kelvin, however, as well as the Carles, are inclined to the opinion that radium will prove one of the greatest scientific

Its commercial possibilities are of course, also very great. If a point no inrger than a pin's head carried in the

think great things will come from radium

of their theories in radium. Lots of marvelous properties are being claimed for radium, and the peculiar part

Both Sir William Crookes and Lord

agents in the world. Its commercial

Medical Men Look to It.

nations; and as it also possesses photo-graphic powers, perhaps the hind may yet be enabled to see pictures.

perpetual, the stimulous would never die. The war of the future will merely be a question as to which power has the larg-est chunk of radium. As its rays can phide or platino-cyanide of barium.

cept by the wealthiest scientific inves-tigators. It is worth more than its weight in diamonds A single gramme is worth about \$2500; an ounce, \$100,000; while a pound, gentle reader, should you in for the triffing sum of \$1,555,000. It will be quite a while before there is a "corner" in the radium market at these proces. The discovery of radium was not so much the result of accident as the pro-uct of patient investigation. Some years ago M. Henri Becquerel conducted some experiments with the sails of uranium, uct of patient investigation. Some years ago M. Henri Becquerel conducted some experiments with the saits of uranium, um replenishes its energy from the mole-cules in the surrounding atmosphera; other scientists think the rays come from

experiments with the saits of uranium, and he found that they were continuous, by giving out a sort of stream of cor-puscies, or minute atom-particles, which science has called electrons. Becquerel's discovery in relation to uran-fum resulted from finding that air sur-rounding an electrified body became con-ductive of electricity. Becquerel also dis-covered that the rays from the saits of

THE ROADMASTER'S STORY

How to Light a Room.

How to Light a Room. By coaling the walls of an office with sinc sulphide and then suspending a few grammes of radium from the celling, the um projectiles; or, perhaps, armies will sinc sulphide and then suspending a few

LORD KELVIN THE ENGLISH EDISON WHO EXPECTS GREAT THINGS OF RADIUM

By Frank H. Spearman

the city would be forever luminous. No still greater discovery of "animits maching to the renewals of material would be required, so far as the radium was concerned. It bouses from time to time with zinc sui-bouses from time to time with zinc sui-Radicity may soon be a substitute for

ways incougn the storm and a live en-gine boomed under the Wicklup windows. "Phil, I want you to be careful!" It was Bucks standing by the roadmaster's side at the window. "It's a bad night!" Halley made no answer. "A wicked night," muttered Bucks, as the lighting shot the vards in a blace and a crash shot the yards in a blaze and a crash

rolled down the gorge. But wicked as it was he could not bring himself to coin-termand. Something forbade it. Evuns, the conductor of the special, ran in.

"Here's your orders!" exclaimed Duf-fy. Evans nodded as he took the tissue. Halley buttoned his leather jacket and turned to Bucks.

"Good-by.

"Good-by." "Mind your track," said Bucks warning-by to Evans, as he took Halley's hand "What's your permit?". "Forty miles an hour." "Don't stretch it. Good-by, Phil," he added, speaking to Halley. "Til see you in the morning." "In the morning."

moref Their blood has washed out their foul footsteps' pollution; No refugs could save the bireling and slave From the terror of flight, or the gloom of

the grave: And the Star-Spangled Banner in triumph doth

Wave O'er the land of the free and the home of the

brave!

Oh, thus be it ever, when freemen shall stand Between their loved homes and the war's

taunted him with his heavy heels. After a bit he got down and threw coal for Durden mile after mile, and crowded the boller till the safety screamed. Then go-ing around to the right, the roadmaster covered Denis Mullonix's fingers on the throttle latch and the air with his big hands and good-naturedly coaxed them loose, pushed the engineer back and got the whip and the reins into his own keep-ing. It was what he wanted for he the whip and the reins into his own keep-ing. It was what he wanted, for he smilled as he drew out the bar a notch and settled himself for the run across the flat country. They were leaving the foot-hills, and when the lightning opened the night they could see behind through the biasting rain the great hulking piledriver nod and reel out into the Painted Desert like a drunkee man more than 16,000,000 sithough it is esti-mated that there were in 1901, almost 22,-000,000 children of school-going age in this country. Our yearly expenditure per pupil averages 222.

all that a lle's experience, sating living, li

AllET'S father was a section forman. When Hulley was a kid as fity-guilder bridge to bar the Spider some this sources bridge. The sector section here was a draughts man at work he was no good for errands. At such times he went all into a mental factor all times. The spider water a bridge to the Elour would have said any to the Boilder to called a fits of the month/reported for dura the Boilder and the Boilder bridge to bar the Spider bridge to bar twee spider bridge to bar the Spider bridge to bar twee spider bridge to bar the Spider bri

mind-concentration, absolute. Mathemat-ics, drawing, bridges, brains-that was Hailey. All that Brodie knew Halley had from him; and where Brodie was weak, Hailey was strong-master of himself.

was a Brodle man. Single mind on single mind on single mind acconcentration, absolute. Mathematical particular probability of the provided service and provi

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appointed assessment and the said Hafley, open-"Well, well, well," said Hafley, open-ing his eyes. "Here's promotions right

him his education as an engineer. The minute he found out he wasn't regulariy graduated he froze up. Very polite, but he froze up. See? Experience, actual ac-"But if we iose just one more bridge

gan joking and laughing the minute they got away. He sat behind Denis Mulle-nix on the right and peked at his ribs and taunted him with his heavy heels. After

added, speaking to Halley. "Til see you in the morning." "In the morning." repeated Halley. "Good-by. Nothing more in, Duffy?" "Nothing more." "Come on!" With the words he pushed the conductor through the door and was gone. The switch engine puffed up with the caboose. Ahead of it Ed Peeto had coupled in the pliedriver. At the last minute Callahan asked to go, and as the bridge gang tumbled into the caboose, the assistant superintendent. Ed Peeto and Halley climbed into the engine. Dennis Mullenix sat on the right, and with Wil-liam Durden, fireman, they pulled out, five in the ckb, for the Spider Water. From Medicine Bend to the Spider Water is a 50-mile run; down the gorge, through

Between their loved and desolation! Blest with victory and peace, may the heaven-rescued land that hath made and pre-From Medicine Hend to the Spider Water is a 30-mile run; down the gorge, through the foothills and into the Painted Desert that fills the jaw of the spin we inter-sect again wast of Peace River. From the Peace to the Spider the crow files 20 miles, but we take 30 for it, there is hardly a tangent between. Their orders set a speed limit, but from the beginning they crowded it. Halley, moody at first, be-gan joking and laughing the minute them rescued land Praise the Power that halb made and pre-served us a malion! Then computer we must, when our cause it is

and this be our motto: "In God is our trust," And the Star-Spangied Banner in triumph shall wave O'er the land of the free and the home of the

WHAT OUR SCHOOLS COST US.

It is probably not generally known that the United States spends annually on elementary education about \$227,000,000-the exact figures for 1900-1901 were, according to the report of the United States Commissioner of Education, \$256,968,258 Europe spent during the same period ap-proximately \$26,000,000. The enrollment in the elementary schools of Europe is, bowever, in the neighborhood of 45,000,000, while in the United States it is not much