

X-Ray Tube Is Aid to Science

Dr. Lillienfeld Discovers Principle That Puts Roentgenology on New Plane.

EXPERTS PLEASED WITH IT

Scientists Who Have Experimented With New Tube Believe With Doctor Lillienfeld That It Makes Roentgenology Exact Science.

New York.—By the invention of an X-ray tube based on a comparatively simple principle, roentgenology promises, for the first time since Roentgen discovered the mysterious rays that bear his name, a quarter of a century ago, to be an exact science. The inventor is Dr. Julius Lillienfeld, professor of physics at the University of Leipzig. He is also inventor of the X-ray tube that has been in general use in Europe for the last decade, and which from now on will be superseded by his more recent discovery. Experts who have experimented with it believe as he does.

Doctor Lillienfeld is in New York, having arrived from Europe a few weeks ago. He has already given a public demonstration of his new tube in the presence of Prof. George Fegram and Professor Davis at the department of physics of Columbia university and before the New York Roentgen society.

Doctor Lillienfeld explained the principles of his invention to a Times reporter. He said his discovery was not only of interest to the medical profession and physicists, but to makers of wireless and all audio apparatus and amplifying devices.

"In order to explain the principle of this new tube," said Doctor Lillienfeld, "it will be necessary to recapitulate the history of X-ray tubes and to tell the manner in which X-rays are generated.

What Electrons Are.

"Let us begin with the electron: It is the smallest known component of matter and is always associated with an unvarying unit charge of negative electricity. The atom of hydrogen is the smallest atom known. Yet an electron is but 1-2000 part of the hydrogen atom. These electrons are always in motion. It is supposed by some that chemical atoms consist of collections of electrons having orbital motions in a sphere of positive electrification. Others ascribe them to disturbance of the ether.

"An electron striking any matter, target or surface produces X-rays. The electrons must have speed, and, indeed, they move with incredible rapidity. They are negatively charged particles of electricity. There are three factors, therefore, connected with the production of X-rays. They are electron, motion and the target."

Doctor Lillienfeld pointed to a knife blade. "The electrons associated with that piece of metal," he continued, "are beneath its surface and are retained there by some superficial force. To produce X-rays we must get the electrons out of the metal through the co-operation of some additional force. Roentgen used gas molecules, which were imprisoned in his glass tube in a partial vacuum, to get the electrons out of the metal, which, in this case, was the cathode by which the electric current leaves, in contradistinction to the anode by which the electric current enters, a vessel. The molecule of gas impinged on the cathode free-

ing the electrons, which, in turn, flew to and impinged upon the anode or target, from which they were thrown off as X-rays which penetrated the glass tube and scattered.

"The method of producing X-rays by the gas tube did not prove satisfactory.

"In 1911 I made my first tube on a new principle. There was absolute vacuum in the tube, and I got the electrons out of the cathode by means of applying heat to it. With the combination of the heated cathode and the extremely high vacuum, the electrons would fly to the anode, or target, where they were given off as X-rays.

"In 1913, Coolidge, in this country, applied the same idea to the tube now in general use here.

New Method Discovered.

"Two years ago I discovered a new method of effecting the release of the electrons from the cathode. This method has nothing in common with either of the two older ones. I started the electrons from a cold, unheated cathode in the presence of a high electrostatic field. This actually pulls the electrons out of the cathode. The second distinctive characteristic of the new method is the shape of the cathode. I use a sharp-pointed or sharp-edged one, on the theory that the lines of electric force are concentrated on the sharp point or edge of the cathode. This proved to be the case

in actual practice and the electrons were readily pulled out. I might add that in this method the electrodes (cathode and anode) are brought very closely together.

"The application of the principle is not limited to the production of X-rays. It can be applied to all amplifying and audio devices and for generating electro-magnetic waves for wireless. The tube is less expensive than the heated ones because it contains no hot filaments and, therefore, no transformer is needed to supply heat."

Lay Bandit's Career to Slant in Skull

Tacoma, Wash.—Roy Gardner, mail train robber, in the federal penitentiary after two very sensational escapes from guards, may be operated on to "reform" him, according to "Mother McColl, woman agent of the Department of Justice.

"I want to be operated on and lead the life God intended me to lead," Gardner told Mrs. McColl.

"Gardner is a wonderful specimen of manhood," Mrs. McColl continued. "His tendency to crime is caused by a deflection of the cranium, and it is possible that surgical care will eliminate it.

"He is to be X-rayed, and the physician at the prison will send to Los Angeles for X-ray plates which are said to show the seat of his trouble."

Where Railroads Are Not Wanted

Afghanistan Years Ago Put Up "Keep Out," "This Means You" Warning.

SEND ENVOY TO WASHINGTON

Believed That Policy of Absolute Isolation From Rest of World Long Followed by Moslem Kingdom Is to Be Modified.

Washington.—The arrival in Washington of an envoy from Afghanistan, now perhaps the most mysterious country in the world, seeking the recognition of his home land and the establishment of diplomatic relations with the United States, seems to indicate that the policy of absolute isolation from the rest of the world long followed by this Moslem kingdom is to be modified. Light on conditions in this little-known region is shown by the following communication to the National Geographic society from Frederick Simpich and Haji Mirza Hussein:

"The buffer state of Afghanistan, historic shock-absorber between Great Britain and Russia in Middle Asia, years ago put up a 'Keep Out' sign, 'This Means You' warning, to all white men and Christians. The land is 'posted'—to use a poacher's phrase—posted against trade and concession hunters, against missionaries, and against all military and political hunters in particular.

"Keep Out" Sign Up.

"And the 'Keep Out' sign is still up. Today the foreigner is no more welcome in Afghanistan than he was a hundred years ago. Forbidden Lhasa

itself is no more exclusive than brooding, suspicious Kabul, the capital of this isolate, unfriendly realm of fanatic tribes, of rocks, deserts, irrigated valleys, and towering unsurveyed ranges.

"For reasons of foreign policy, the amir has long left the necessity of excluding his little-known land to the greatest possible extent from the outside world. Only a few Europeans, mostly British, but occasionally also an American and now and then a few Russians or Germans, have had permission to come into this country and to sojourn for a while in its curious capital. But even on such rare occasions as when a foreign engineer, or a doctor whose services are badly needed, is admitted by the grace of the amir, the visitor is subject to a surveillance that amounts almost to imprisonment.

"No ambassadors or ministers, not even missionaries, are permitted to reside in this forbidden Moslem land.

"Today no other monarch anywhere wields such undisputed authority or is in closer touch with the everyday life of his subjects. He personally runs his country's religion, its foreign affairs, and he even supervises much of its commerce. He also owns and censors the only newspaper printed in all Afghanistan.

"From the World war, though he took no active part in it, the amir emerged with singular profits. His old and once rival neighbors, Great Britain and Russia, drawn together as allies in the world conflict, left him a free hand, and in 1919 Great Britain officially recognized the political independence of this much-buffed buffer state, to whose rulers he had so long paid a fat annuity.

"With an area of 245,000 square miles, Afghanistan is, next to Tibet, the largest country in the world that is practically closed to the citizens of other nations. But political life at wary, alert Kabul is in sharp contrast to the meditative seclusion and classic aloofness of the pious lamas at Lhasa. Amir Amanullah Khan, through his agents in India and elsewhere, is in close touch with the world's current events; and, as the last remaining independent ruler of a Moslem country, now that the power of the Caliph at Stamboul is broken, he wields a far-reaching influence throughout the Mohammedan world; also, because his land happens to lie just as it does on the map of the world, it is plain that for a long time to come he will be an active force in the political destinies of middle Asia.

Wives Distributed as Gifts.

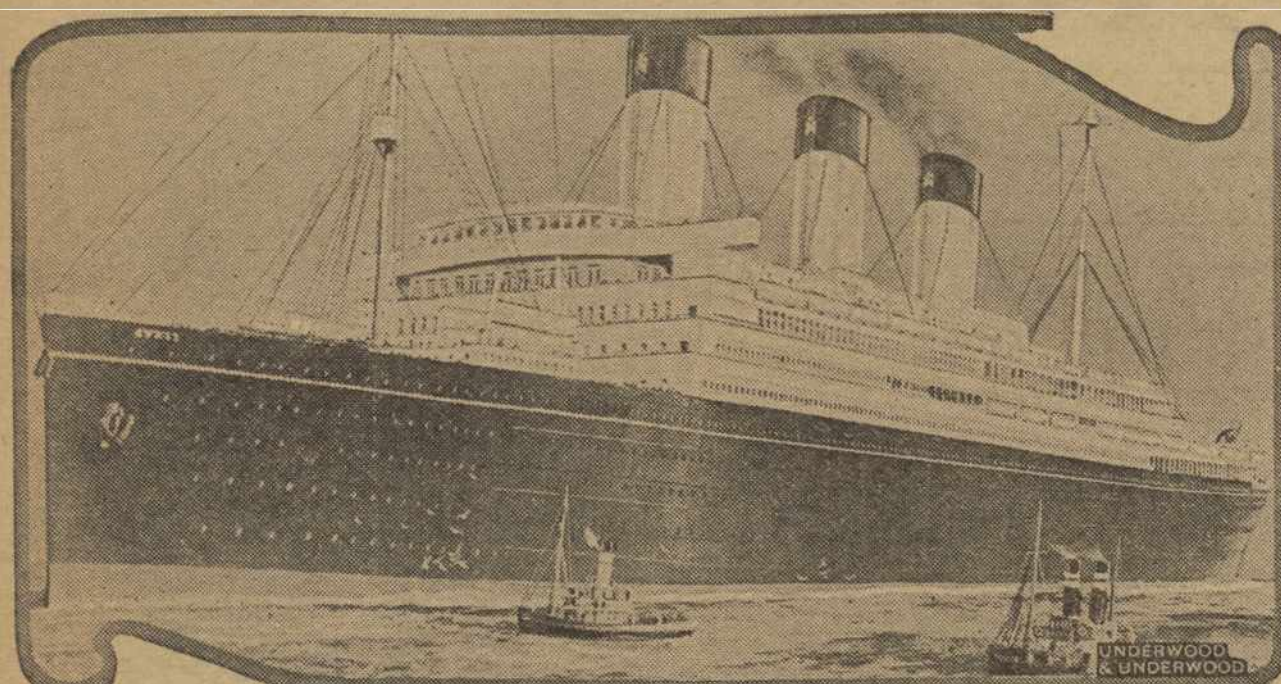
"From the Persians the Afghans got the idea of marrying more than one wife; but, like the Persians, too, they have found, to their dismay, that polygamy is nowadays more expensive than exciting.

"Sometimes, when the amir wants to favor his faithful officials with presents, or perhaps to play practical jokes in certain cases, he distributes women among them; but these 'gifts' often prove so troublesome that no great degree of gratitude is apparent among the recipients.

"Amir Habibullah Khan (who was assassinated in 1919) had a harem of over 100 women, and among these, strangely enough, were a few Europeans. The present amir, Amanullah Khan, has but one wife.

"The trade of Afghanistan is moved entirely by caravans and is largely in the hands of Hindus and Tadzhiks. There is not a mile of railroad in the kingdom, the amir fearing that steel highways would make isolation impossible.

Majestic, the Largest Ship in the World



This picture, based on the builder's drawings, is the first to be published of the world's biggest ship—the Majestic, now being completed at Hamburg. The Majestic registers 56,000 tons—about 50 times as large as any of the packet ships of a century ago and nearly equal to the entire tonnage of the 132 ships which formed the famed Spanish armada. Its dimensions: length overall, 956 feet; breadth, 100 feet; draft, 40 feet. It will accommodate 3,536 passengers, and will carry a crew of 1,200. Turbine engines drive four screws and the boilers are heated by oil flame.

Will Use Lethal Gas on Convicts

Nevada Law Provides Peculiar Form of Execution for Men Convicted of Murder.

CHAMBER IN NEW PRISON

State Architect Ordered to Plan Chamber Where Witnesses in Safety May See Man Die—Some Say Method Is Cruel and Barbarous.

Carson City, Nev.—In this capital city of Nevada they are building a new state penitentiary which will contain a lethal gas chamber for the execution of condemned criminals.

Under a law passed at the recent session of the state legislature all persons condemned to death in this state must be killed by the administration of lethal gas.

The laws affecting the death penalty have been out of the ordinary in this state for a number of years past. Under certain restrictions the condemned criminal has been able to choose his own method of execution. The last man to die at the hands of the state was one Mircovich, who, in the language of Gov. Emmet D. Boyle, "accepted shooting." The condemned man was seated in a chair in the prison yard with his back to a wall. A diagram was fixed upon his clothing. A company of men were engaged to shoot at the living target. All the riflemen were expert marksmen. As they entered the prison yard they were handed loaded weapons. Some of the guns contained blanks and others were loaded with steel bullet shells. No member of the firing squad knew what his rifle contained.

Death Was Instantaneous.

After the single crash of the volley that snuffed out the forfeited life it was found the figure "8" traced on his breast had been perfectly perforated by the bullets, which were found to have plugged the back of the chair on which he sat. The chair of the state's "shooting gallery" is one of the gruesome objects of curiosity which you can see in the old prison yard. The figure "8" is very accurately outlined in the wood where the bullets lodged after they sped through the human body.

Those who witnessed the execution say that death was practically instantaneous. The physicians believe that shooting is the quickest, least painful and most humane method of execution.

The new law has precipitated much discussion. There are many lawyers in Nevada who hold that a criminal may not be legally executed by lethal gas. They say it is unconstitutional because it violates the constitutional prohibition against cruel, barbarous and unusual punishment. There is sufficient weight to this contention in the minds of the members of the prison board so that they have carefully preserved the gallows for such use as may be necessary.

Gov. Emmet D. Boyle, head of the state, who signed the bill making the lethal gas execution legal, holds that it is perfectly feasible and constitutional.

"There are a number of lethal gases that may be employed," he told me. "Any will produce practically instant death. I satisfied myself thoroughly concerning this phase of the proposition before I signed the bill. I am convinced that this method of execution can be simply administered and will be effective.

Use Mechanical Methods.

"The gas will be administered by some person designated by the warden. It will be administered by mechanical methods. The execution by this method will not be painful.

"I do not think, however, it is related in any respect to the abolition of the death penalty.

"No actual steps have yet been taken to provide the facilities for the

use of the law. We are not a very populous state and we have no one waiting the death penalty. For this reason we are not making great haste in getting ready for executions which may not occur for many years.

The ticklish job of providing the conveniences for sending a human being across the great divide by lethal gas has been assigned to the state architect. He must build a chamber in which the victim may be housed while the watchers and witnesses provided by law are present while he is put to death. As is well known in connection with the lethal gases used during the war, the slightest diffusion of these elements caused widespread havoc.

It is not possible to build a chamber which is relatively hermetically sealed, because it will not permit the provision of the law be carried out. Neither is a glass chamber feasible. The likelihood is that the death chamber will be so built that the gases will be blown away from the necessary witnesses and watchers if any fumes should escape.

Absolutely Painless.

It is anticipated the gas will be administered much as gas is administered to a patient in a dental chair or to a person preparing for a surgical operation. In other words, it will be a form of anesthesia, and the administrator will probably be an expert anesthetist chosen from among physicians or male nurses. Those who favor this method of dealing death declare it is absolutely painless. Most of the advocates of the measure believe that the condemned criminal should be given a sleeping potion in his food and that the lethal gas should

Lightning Photographs Tree on Boy's Back

Eastman, Ga.—Struck by a bolt of lightning, Travis, youngest son of J. J. Grimsley, lives and is carrying on his back a photograph of a cedar tree.

The boy was sitting in a swing on the front porch of his home when a flash shattered a cedar tree a few feet from the house. The current passed through the boy's body, rendering the youth unconscious. He recovered in a few minutes and members of the family found a photographic plate of a tree on his back.

Jakie Burch, fifteen, son of C. C. Burch, was also struck by lightning. A round hole was burned in his cap. He was unconscious for only a few minutes.

be administered in the subsequent slumber. The claim that no gas can be administered without awakening the sleeper is disputed.

World-wide interest has already focused upon the state with its vast area and its small population on account of this extraordinary death penalty. Students of prison reform are divided concerning the humanity of the measure. Its application will be watched with exceptional interest by scientific organizations and colleges.

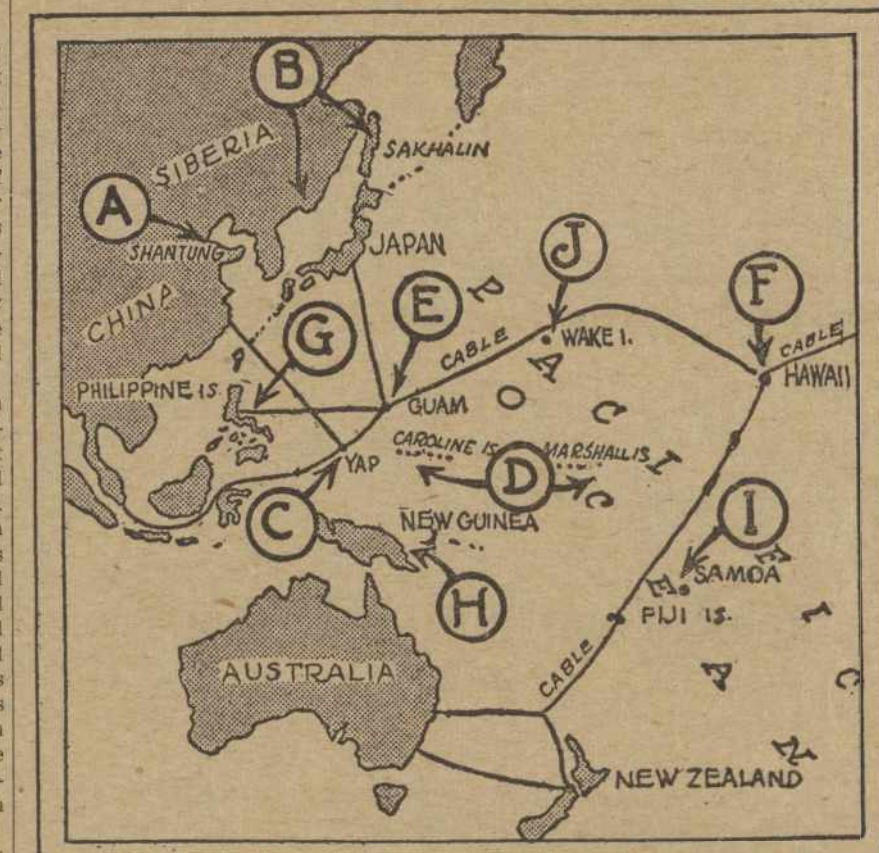
There is little likelihood, however, that Nevada will permit the execution to become a public show. Executions are not popular in Nevada. There is a very active sentiment against carrying out the death penalty. Since the state was admitted to the Union only six men have been condemned to death, and of these only two were allowed to be executed.—Arnold Kruckman in New York World.

Trying to Get Jobs for Ex-Fighters



The Aviation Club of Chicago is making a desperate effort to secure employment for ex-soldiers, sailors and marines. At the Princess theater four ex-service men occupied a box upon which was a sign stating that the men were looking for work. A speaker appealed to the audience to try and secure work for these patriots. Many of the audience were moved to tears and those who could not offer any suggestions as to where work could be secured offered money to the men.

SOME OF BIG QUESTIONS IN PACIFIC



A—By the treaty of Versailles German rights in the Chinese province of Shantung were transferred to Japan. The United States senate adopted a reservation in the treaty withholding American acquiescence in this transfer. China refused to sign the treaty because of it.

B—Japanese forces are still occupying parts of the Siberian coast provinces. Japan has also occupied the north or Russian half of the Island of Sakhalin.

C—Yap is the important cable station islet, a mandate over which was irregularly awarded to Japan by the allied supreme council. President Wilson had made a reservation on Yap and the United States has not relinquished its right to participate in the disposition of these former German possessions, turned over by Germany to the five allied and associated powers.

D—Mandates over the Caroline and Marshall Islands were awarded to Japan by the allied supreme council. The American delegation to the peace conference did not contest these assignments.

E—Guam is the most important American naval base in the western half of the Pacific.

F—Hawaii is the most important American base in the middle Pacific.

G—The Philippines, an exposed American outpost in the Far East, can be held only if the United States can maintain a fleet in the Pacific based on Hawaii and Guam.

H—The German part of New Guinea was assigned to Australia.

I—The German portion of the Samoa Islands was assigned to New Zealand.

J—Wake Island, which belongs to the United States.