

HE TAKES PICTURES THROUGH LIVE FLESH

Professor Roentgen, of the Bavarian State University, Invents a Way of Making Photographs of the Bones Inside a Living Human Being Without Cutting Him Apart or Boring Holes in Him to Do It.

Vienna, Jan. 1.—One of the most remarkable of modern discoveries has just been made public by Professor Roentgen, of the Wurzburg University. It is a process by which the interior of a living human body may be photographed. The light by means of which this remarkable feat can be achieved will also penetrate all organic substances; that is, wood, leather and articles of the same class.

The light which renders all this possible is derived from radiant heat, and is of wonderful penetrative power. It is thrown upon the object by means of one of Crooke's tubes. This is a vacuum or air-tight glass tube, through which an induction (electrical) current passes, and the rays from the intense heat caused by the current, which is known as radiant heat, are thrown from the tube upon the object it is desired to photograph.

Professor Roentgen has succeeded in se-

considered a crucial test, and demonstrated beyond the possibility of a doubt that only a few of the wonders the new process will accomplish have been learned.

The Crooke tube used is arranged like the lens in an ordinary camera, the induction coil—that is, the wire over which the electricity passes into the tube—running from a small storage battery arranged in the camera, and at the rear of the tube. Then over the end of the tube from which the heat rays are focussed a heavy cloth is thrown in such a manner as to clearly outline the tube's end, enabling the operator to focus the rays without difficulty. Thus it will be seen that the photograph is taken through this heavy cloth, as well as the substance surrounding the object it is desired to reproduce.

Strictly speaking, radiant heat rays are by no means a new light, but Professor



"A Grinning Skeleton Sat Beside Her."

(Two photographs that show the possible marvels of the new discovery by Professor Roentgen, of Wurzburg University.

are acted on by radiant heat, which is nothing more nor less than light that cannot be seen. In fact, it is photography through volcanite. Low waves of radiant heat pass through the sensitive plate, and the desired result is obtained. The inventor works with what we call waves of low refrangibility.

"While no such advanced idea as this man has made public ever occurred, I had thought of the possibility of photography by means of radiant light. For instance, it seemed to me that if you stood a man up and let his body form part of a partition, for instance, with rubber on each

side of the body, by means of a powerful heliostat you could throw an equally powerful ray of light directly through that body, the result being a photographic reproduction of the interior of that particular specimen of man.

"There would seem to me to be no reason why the process of photography under stated conditions could not be so advanced as to photograph the interior of the human body by sections. Of course, this would be of considerable aid to medical science. For instance, if a man was suspected of having a tumor, all that it would be necessary to do would be to

photograph the section of the body where the growth was supposed to exist.

"Then, in case of a wound by a bullet, it would be an easy matter to merely photograph the interior of the patient and locate the foreign substance without any of the painful preliminaries surgeons are forced to resort to nowadays.

"There is a possibility that this photography can be so developed as to put an end to all necessity for vivisection. That is something, however, which surgeons must decide, and yet it seems to me if by means of photography the entire interior of living man can be laid bare, most of the

information the vivisectionists seek could be gained in this way.

"It is possible, too, to penetrate the interior of the skull and get an exact photographic representation of a living human brain performing its functions. In point of fact, to see a man think.

"There are many things that might be done, so you can see what I mean when I say the possibilities and utilities of the discovery are limitless."

"We have been talking of what our Vienna friend's new ideas will do for medical science. Now let us see what they will do for metallurgy and mineralogy.

"What a marvellous aid to the prospector! He can by means of this apparatus lay bare the secrets of the earth. There is a process now by which much can be learned regarding magnetic iron ore, but the process will not apply to other metals. By this new process all the dips, spurs and angles of the veins and the character of the mineral contents could be easily discovered. It will save an immense amount of labor and expense. Naturally the ordinary prospector might not take to it kindly, but where the presence of certain bodies of ore was known it would be of untold advantage to be able to tell without sinking any shaft the depth and quality of contents of the veins, as near as the latter could be judged from a photograph.

"This new process is all right when only organic substances or those of the animal and vegetable worlds are encountered. Wood is an organic substance, and therefore the rays of radiant heat would have no difficulty in penetrating it and thus enabling a photographic reproduction of the contents of a box, as has been done by this great scientist.

"The cardinal factor of the whole matter is this radiant heat, but I am satisfied the Wurzburg inventor has special rays thereof and special chemical plates. Radiant heat is the energy of heat transferred to the luminiferous ether which fills all space and also pervades all bodies. The hot body sets the ether particles in vibration, and this vibratory motion, in the form of waves, travels in all directions and with a velocity of about 180,000 miles a second.

"There is no essential difference between radiant heat and light, both being forms of radiant energy, the ether waves differing intrinsically among themselves in wave length only, and thus producing different effects, heating, luminous and chemical, in the bodies on which they impinge, according to the nature of these bodies. The waves whose heating effect is generally the greatest are of greater wave length than those which most affect the eye—light rays—and have longer periods of vibration. The quantity of heat of a body or the amount of heat energy which a body gains or loses in passing through a different range of temperature is measured by the quantity of water it would raise at one degree Fahrenheit.

"This gives you an idea of what radiant heat is, and we see by this new process what a powerful agent it can become. Take, for instance, water or any liquid substance so dense that by means of ordinary light it is impossible to see any distance beneath the surface. By means of this new process and the radiant heat rays that form its cardinal principle I see no reason why a photograph could not be taken of any part of the bottom of the ocean, for the rays of radiant heat will penetrate for miles if necessary. See how easily wrecks, sunken treasure and even breaks in submarine cables can be readily located.

"As a matter of fact, this new process, if it does all that is claimed for it, and I see no reason why it should not, practically lays bare nearly all the secrets of nature. Photography by means of radiant heat can show the mechanism of the human body in full operation. Any organ can be photographed, and by means of such photography its condition would be apparent to the eye of the medical man.

"I don't see any reason why, as I said, this process cannot be developed almost to infinity. It is merely a question of time and further experiment to get into

general use, a man, instead of going to a doctor first to have his heart examined if he thinks it is in a bad way, will go to the photographer and get a picture of his heart, take it to the doctor and ask him his opinion. The idea is capable of development in all directions. The safe robber might carry a camera with him, photograph the contents of a safe, and thus learn whether it was worth taking. A man with a large consignment of shell oysters might turn his camera upon them and find in this manner if there were pearls concealed in the shells.

"Out in the gold and silver mining country, where the mines are in close proximity to one another, men might send the rays of radiant heat from down the shafts into neighboring territory, and thus learn the actual value thereof. In looking for sunken treasure the powerful heat rays might be so directed that millions could be located and easily recovered.

"It would be possible to go to the diamond fields of South Africa, for instance, and by persistent effort photograph one's self into a millionaire. Then, should one believe that there is a meeting of conspirators in some room, what is to prevent, if this process is correct, a photograph being taken through the wall that will show the face of every person present?"

"NOT AT ALL IMPOSSIBLE.

Professor Henry Morton, the Eminent Scientist, Discusses the New Discovery.

"Professor Roentgen's discovery is not impossible," said Professor Henry Morton, president of Stevens's Institute of Technology at Hoboken, "but I must confess it hardly seems probable to me. There are several potent scientific reasons which lead me to doubt the practicability of the discovery as regards some of the experiments said to have been made. It is not improbable the bones of a human hand might be photographed. Hold your hand up before a strong electric light, for instance, and you will notice you can faintly see the light through it, which indicates it is not opaque. Therefore it might be possible to

locate a bullet in a living man's ankle. (From a photograph taken by the new process.)

Locating a Bullet in a Living Man's Ankle.

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throw such a strong light upon the hand that the bones could be shown in a negative.

"Radiant heat, which is probably the source of the light Professor Roentgen is said to have used, is certainly a powerful agent. The rays it gives out are exceedingly strong. The use of the Crooke tube would of course enable an excellent focus to be secured.

"However, it puzzles me to understand how an object inclosed in a box could be photographed, for the simple reason that the box is opaque; that is, impervious to light. There's an obstacle that has to be explained away before you can go any further. I was discussing this subject with Mr. Edison only a few days ago, and heard his theory about it. He confesses, with the exception of the hand negative, I am as skeptical as before.

"Why, if this discovery were correct, it would be a measure revolutionize science. It would absolutely destroy the basis of some of the cardinal principles. You can't see through a wooden box any more than you can through a stone. Neither can I conceive of a light sufficiently brilliant to penetrate either. If this process should really prove to be correct and practical, there would be no limit to what could be accomplished. There would be practically nothing so hidden that it could not be photographed, and there is no telling what experiment would reveal.

"I should want to see a practical illustration of this alleged discovery before discussing it in all seriousness. As I said, it is by no means improbable, but I think hardly possible."

Professor Morton is, as all the world knows, an expert in electrical and metallurgical matters, as well as all about photography and every other kind of nature. For a quarter of a century he has been one of the foremost scientific authorities.



The Contents of a Purse Seen Through Its Leather Sides.

(From a photograph taken by the new process.)

curing several remarkable negatives. One instance is that of a man's ankle wherein a bullet was imbedded. The photograph shows the bullet just as it is lodged in the ankle, thus revealing what heretofore could only be learned by probing and the use of the surgeon's knife.

In another case, a purse, containing a quantity of money, was selected as a subject. The heat rays focussed thereon produced a negative showing with wonderful clearness both purse and contents.

A human hand was then subjected to the heat rays. In the picture resulting appears a skeleton hand, the covering of flesh seeming to have vanished as if by magic. It must be remembered, too, that this was not the hand of a dead person, but belonged to a living, breathing man, the remainder of the arm being so screened and arranged as to be excluded from the focus of the tube-camera.

Perhaps the most notable experiment, however, which illustrated with graphic clearness the eccentric power of the new discovery, was the photograph of a man seated beside a young lady before the photographer in ordinary dress, but whom the negative shows a perfect skeleton. To test the clearness with which the new process would reproduce the skeleton of a living subject negatives were also taken by the ordinary method. In the first case the spinal vertebrae were reproduced in every detail, forming a ghastly specimen of realism.

Again, an ordinary iron weight was placed inside a wooden box one and one-half by three feet. In the picture the weight alone is seen, the box having apparently vanished in air. This latter was

Roentgen has, by experiment, gained the ability to secure special rays with which scientists are not familiar.

Professor Roentgen has also overturned the scientific theory regarding opaque objects; that is, objects which it is held light will not penetrate. He holds and claims that his newly discovered process will clearly show, even more than now, that there is no such thing as an opaque object. The penetrating power of light, he claims, is regulated by its intensity and method of use. The Professor further says he is convinced from facts that the discovery has brought to his knowledge concerning heat that the greater uses of heat and electricity are not known yet; that they are capable of vast development. He is now carrying on in secret a series of experiments by which he believes he will soon be able to accomplish even more wonderful feats of photography.

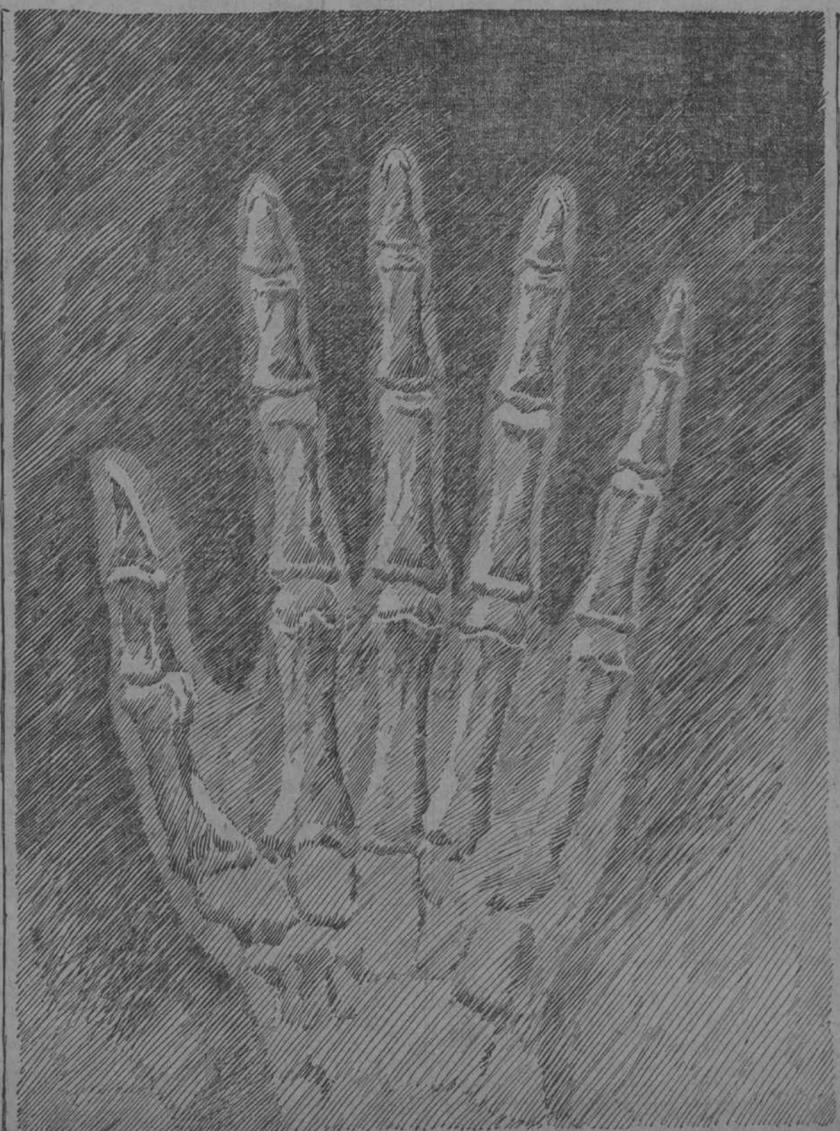
EDISON IS ENTHUSIASTIC.

He Believes That It is Destined to Be the Discovery of the Century.

"There is nothing impracticable about this Professor Roentgen's discovery," said Thomas A. Edison, "and if the reports concerning it are correct, I consider it one of the most remarkable scientific discoveries of the age. Its possibilities may prove almost limitless. It is one of those things we advance with only through experiment."

"This Bavarian professor had evidently been a tireless experimenter, and at last he has learned one of the undiscovered wonders.

"How is it accomplished? It seems to me that his method is about like this: He has plates sensitized with chemicals that



Taking the Bones Through the Flesh.

(From a photograph taken by the new process.)