

...contracting wireless and communications. While per- not so revolutionary in its nature, the achievement is hailed by many interesting others.

NEW CONTROVERSY
Essentially, it promises to launch the Pasadena antenna in a new controversy, with Kolbner of Germany. Dr. Kolbner was first accused the morning theory that gamma rays enter the atmosphere in increased intensity in proportion to the distance from earth. These rays have been called "X-rays" and "gamma rays" by the radio-active substance known to exist in the air. The question that at once was "Why, then, should gamma rays become stronger away from the earth?" Dr. Otto said, "Was to find the source of radio-activity we know it was in nature. We wanted to know, if possible, whether the gamma rays came from the sun, as has been thought heretofore, or whether source is the atmosphere."

Scientific calculations told the scientists that if the gamma rays came from the sun they have to strike atmospheric resistance of two and one-half feet of air. But it was an important item, for which possibilities which the answer to this question.

CLAIM IS CONFIRMED
The first step was to check Kolbner's statement that the penetrating radiations—or Nature's X-rays—were stronger the higher one went. A marriage instrument, electroscopes, was used, and many tests were made by Dr. and associates, under the direction of Prof. Millikan.

To appreciate the experiments conducted and realized the conditions with which the tests were made it is necessary to understand the electroscopes. The manner in which the radiations are detected, made to reveal by the atoms, the measure themselves, is as follows: as the rays of the sun are told me at the Institute. There is nothing pretending of the electroscopes. It looks much like a springing can, the back in the middle of the top. The one used by Pasadena scientists is about 10 inches high, and 10 inches in diameter. It is made of brass and each-like thing is the microscope tube through which the top of the can is watched. It is filled with a gas measured by using one of the fact that the gamma rays split the molecules into two parts, one charged strongly and one positively. The assumption this by striking atoms making up the air in the can and creating sufficient ionization in the atoms to dislodge nearest electrons from their normal places. And when the electrons are set free of their atoms, the electroscopes (the them).

HOW IT WORKS
The electroscopes themselves might-like that in this way inside the instrument there is a straight chamber in which are loaded from an insulated point quartz fibers, smaller in size than the soldier's wire. These fibers are placed with platinum to make them conducting. There, now covered with the oil, are charged with negative electricity by being connected to ordinary radio "B" battery actively charged bodies, as is known, attract positive charged bodies, and vice versa. Now now the gamma rays—called X-rays—so it passes through them and take up very loose chamber of the electroscopes.

...sional there will be about \$600 of molecules drawn on the fibers each second.

Having all these things in mind, remember now that when the story was first charged they spread apart through mutual repulsion because both had negative electricity that two there. In the meantime the impact of the molecules against the electroscopes that were made positive by the action of the gamma rays on them—dislodge negative electrons from the fibers, thereby reducing the charge. And as the charge is weakened the molecules are closer together. The only thing that remains is to measure with the help of the microscopically scale in the tube how much the fibers come together in a given length of time. This will guarantee how many charged molecules have been pulled on to the fibers. And the more rays penetrate the electroscopes the more molecules are drawn to the fibers. Armed with this knowledge, Dr. Otto, a young man, with good lungs, went up in Army planes from March and November 1919, to the altitude of 19,100 feet. Way up above the clouds at every 1000 feet, he made tests and brought back data to show that the German scientist was correct. Castles balloons from Ross Field also were used. These experiments were made in 1917 and 1918, and left no doubt that Kolbner was correct, but gave no inkling of the source of these radiations.

As the Pasadena scientists lacked the first step in the problem. Mount Whitney, the highest mountain in the country, was selected for the tests. This was an expedition of adventure and hazards. The electroscopes half is not very heavy, but a large battery and other equipment had to be packed along. With Dr. Otto were Prof. P. Epstein, L. A. Brown and L. Mont-Smith. At the altitude of 18,000 feet the party had to abandon the pack animals because a large fire broke out. The trail. The experiment was carried on human shoulders and the party progressed upward.

For two days, sitting almost on the top of the world, the Pasadena scientists took observations at intervals of two hours. The most startling discovery as the result of these observations was that the radio-activity apparently did not come from the sun.

"We found," Mr. Otto said, "that the radio-activity was just as strong as night, when the sun was directly under us and the whole mass of the earth was beneath, as it was in the daytime. Therefore we had to discard the sun as the direct source of penetrating radiations."

Last summer Prof. Millikan and Dr. Otto went up to the top of Pike's Peak to continue their experiments. This time it was possible to take plenty of equipment and part of it was a large quantity of lead which, as Dr. Otto will know, is the densest element we have to stop the penetrating force of radio-active waves.

AIDED BY KNOW
Once on Pike's Peak, Prof. Millikan and Dr. Otto built out the electroscopes to work. A series of experiments in which the instrument was sheathed in lead, up to 100 pounds, were made. The gamma rays, which make up Nature's X-rays, travel in straight lines only, and so to get inside the electroscopes where the rays can be measured they had to get through the lead barriers. These experiments showed the radiations were not penetrating enough to have come from beyond the lead layer of atmosphere which surrounds the earth.

And then, while in the midst of these experiments, the Pasadena

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A microscope would be needed to detect its operation

Los Angeles Times 4-27-1924

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