Here and There RADIO On the Air

BUILDINGS IMPORTANT FACTORS IN PLACING OF RADIO ANTENNAE

Radio programs have been detected in safe deposit vaults, in subway tubes under rivers, or under the sea in submarines.

"There is no question about this," says Dr. Fulton Cutting, "but if some one were to say it is impossible he would be just about right. It can be done, but so badly that it is hardly worth talking about. Metal and salt water block radio waves very effectively. However, they do not block them 100 per cent, and if waves are powerful especially from a local station, the signals can be received in places were the task would seem hopeless, providing a sensative receiver is used.

Steel bulindings are generally poor places for receiving. The radio waves rebound from the steel framework and very little penetrates into the interior of the structure. The rebounding of the waves is a physical phenomenon identical with the reflection of light from a mirror. It must be remembered that radio waves and light waves are one and the same thing. They are both what physicists call electro-magnetic waves, only light waves are about a billion times shorter than radio waves of the length used in broadcasting.

"Much has been written, both mathematically and otherwise, on metallic reflection of light waves. The theory applies to radio waves. Simply stated, it is this, when an electro-magnetic wave strikes a metallic surface it induces electric currents in the surface and these currents are such as to start a new electro-magnetic wave in the opposite direction. If the metal is a good conductor there is very little loss caused by this action, and the reflected wave is practically as strong as the original wave. The electrical conductivity of obstacles in the path of a radio wave is the criterion of whether or not the obstacle will reflect the wave.

"Wooden or brick houses are bad electrical conductors and radio waves cannot set up currents in them. They do not reflect, and therefore the waves pass right through them. In steel buildings, however, currents are set up in the girders and reflection occurs. In between girders the waves penetrate somewhat. They bulge into the building in the process of being reflected. This phenomenon may be easily investigated by means of a portable loop set. Near the window of a building of heavy steel construction signals will be strong, but if the set is carried into the interior the signals will get weaker and weaker until they practically disappear.

"This shielding effect of steel buildings is very harmful to loop receivers and indoor antennae," explains Dr. Cutting. Aparement house installations are in some cases difficult for this reason. Outside antennae generally solve the problem. When outside antennae are not feasible, however, it is important to get at least a little exposure to the radio wave on the outside of the building. A wire hung on the outside of the building is generally better than a wire run around the molding of the room. Still better is a wire hung out on the end of a fishing pole. This puts the wire further away from the building and exposes it to stronger waves.

"A phenomenon in connection with the reflection of waves from steel buildings is the rapidity with which the waves fill in behind the building after they have passed over it. This filling in will always occur unless the reflecting body is several times larger than the wave length of the electro-magnetic waves."

PATENT GRANTED ON RADIO TUBES

A basic patent for the modern vacuum tube, used extensively in radio, X-ray work and in repeaters used in long distance telephony, has just been granted the General Electric company by the United States patent office. This tube was invented by Dr. Irving Langmuir, assistant director of the General Electric research laboratory, in 1912, but because of contests the patent was not granted until October 20. The tube is characterized by its hard, constant vacuum, by its freedom from visible discharge and other gaseous effects and by its steadiness and reliability in operation. It can be made in large sizes operating with 50,000 volts and upward, as well as in the smaller sizes such as are used in the ordinary home radio receiving sets.

Prior to Dr. Langmuir's invention radio and X-ray tubes were of what is known as the soft variety, that is, they glowed and acted erratically and unreliably except when used on exceedingly low voltages. Dr. Langmuir's invention, by removing this severe voltage restriction, has made possible practical radio as we know it today.

The patent application has had an eventful career. Following his invention of the new tube in 1912, spent months in thoroughly testing the invention. He filed his application in the patent office in Washington in 1913, and made the invention known to the world by papers read before scientific societies and by descriptions of the tube in scientific and popular publications. The new tubes were used for radio work by the French army early in the war and were seen in regular use in radio and X-ray work in this country.

The patent application, however, did not enjoy such immediate success. The patent office examiner passed the application for issue in 1916, but this action was revoked before the patent was issued in order to permit another person, who had in the meantime applied for a patent on this invention, to contest Dr. Langmuir's right to a patent in what is called an interference proceeding.

On the declartion of the interference Dr. Langmuir's opponent attempted to show that the invention was not patentable. On account of the unusual importance of the invention the patent office departed from its usual practice and permitted elaborate testimony to be taken on the question of patentability, including even testimony, taken in England, on behalf of Langmuir's opponent of a world-famous British scientist.

After the United States went into the war, the secretary of the navy requested the commissioner of patents to suspend proceedings because the full time of both parties was required upon war work of great importance to the government. After the war testimony was resumed, and the merit of the invention was eventually sustained by the patent office, after an attack for which there are few precedents in vigor or skill. Thereupon the contest became one to determine whether Dr. Langmuir was the first inventor, and more testimony had to be taken by both parties to establish their dates of invention. The examiner of interference adjudged Dr. Langmuir the first inventor. On appeal to the examiners in chief the decision was again in favor of Dr. Langmuir. On further appeal the assistant commissioner held in favor of the later applicant. But on still further appeal to the court of appeals of the District of Columbia the assistant commissioner was reversed and the court, agreeing with the examiner of interferences and the examiners in chief, found that Dr. Langmuir was the prior inventor. The appeals, though diligently prosecuted, were not terminated until June of the present year.

Among practical inventions made and patented by Dr. Langmuir the best known is probably the type C, or gas-filled Mazda incandescant electric light.

NATIVES REPORTED STARVING

NOME, Alaska, Oct. 30.—Natives along the Chukotsk peninsula of Siberia are starving, it was reported here Friday by Capt. Frank Preston, who brought his trade schooner Sea Wolf into port from that region.

POLICE CARS USE RADIO EQIUPMENT

Adoption of radio-equipped police cars as an aid in the apprehension of criminals has just been announced by Jacob Graul, chief of police of Cleveland, Ohio. The announcement follows installation and tests of radio receiving equipment in the police chief's private car. Installation of similar equipment in the seven other flying squadron department cars will follow immediately.

The Cleveland department has eight 70-horse power cars for squadron work. Each of these cars will carry two receiving head sets and a loud speaker in addition to batteries and other radio mechanism. A sending station of special wave length will broadcast orders from police headquarters to the flying squads at the precincts or on the road.

"One of the chief advantages of the use of radio in the police cars," declared the Cleveland police chief, "is that it will enable us to pick up our squadrons anywhere at a moment's notice and concentrate them to handle emergency work at a given point. It will enable us to cut down the elapsed time between the commission of a robbery or other crime and the pursuit of the criminals."

The Cleveland police plan calls for a radio head set for use in the front seat. Another receiving head set is installed in the tonneau of the car. A loud-speaker installed under the cowl of the car pointed toward the rear can be used for broadcasting to all passengers of the car. Tests of police equipment showed it possible to hear clearly while the car traveled at a speed of 54 miles an hour.

The headquarters broadcasting station, being equipped for sending by special wave length, will permit police to communicate from headquarters to flying squads without outside interference or tuning in by outside parties.

Some lucky fellow is going to get that Chrysler 4 demonstrator at a saving of $225. It is a touring model and [illegible] Howie Motor [illegible]