New "Micro-ray" may Revolutionise Communication

About two months ago, reference was made in the daily newspapers to a demonstration between Dover and Calais of a new system of radio communication. If this system proves to be of commercial value it will have a far-reaching effect on radio communication. The detailed account herewith presented is interesting and illuminating.

ON March 31 of this year a successful international demonstration of a new ultra-short wave system of communication was made between Dover and Calais. The greater part of the equipment was developed by French engineers in Paris laboratories. In this demonstration a wavelength of 18cms. (7 inches) was used for the first time to provide a high-quality two-way radio telephone circuit. The power required was only half a watt, just sufficient to light a flashlamp bulb!

After the great wavelengths, lofty antennae and tremendous power to which we have become accustomed, commercial radio on such a Lilliputian scale seems almost incredible. But when it is added that mirrors directing a special ray which oscillates one thousand six hundred million times a second play an important part in the functioning of this radio development, it is difficult to visualise what has actually been shown to be a sober, practical fact.

Perfectly normal conversations were exchanged between Dover and Calais, and it was particularly noticeable that the clearness and quality of the speech was well up to the standard of a high-quality telephone circuit.

For the benefit of the layman who has not been initiated into the mysteries of the kilocycles, watts and decibels of the scientist, the working of this new kind of radio communication may be described in the following way. At the transmitting station the sound of the speaker's voice is carried to a device known as a "microradion" tube. In this tube (which is not unlike an ordinary radio valve in appearance) are generated waves which oscillate at a rate of one thousand six hundred million times a second. These "micro-rays," as they are called, are then led by two short transmission lines to a transmitting aerial measuring less than an inch long.

After concentration by the ingenious combination of two reflectors into a fine pencil of rays somewhat similar to the light rays sent out by a searchlight, they are thrown into space. The larger reflector measures about 10 feet in diameter, and is arranged to face in the direction of the distant receiving station. At Calais the "micro-rays" are picked up by another set of reflectors and concentrated upon another one-inch aerial, and transformed by means of another "micro-radion" valve and associated apparatus into speech currents suitable for an ordinary telephone. "Micro-rays" are not subject to the fading which is often encountered in ordinary radio communication. neither are they absorbed by rain or fog, as is the case with light rays. The transmitter and receiver at each side of the Channel are spaced about 100 yards apart, and are linked together to allow the interchange of speech in both directions.

THE circuit can also be used for the facsimile telegraph system. The facsimile machines have been placed in operation between Calais to Dover, and pages of printed text fed into the machine at Calais were reproduced at the speed of approximately one page per minute on the Dover side, thus representing not only a great advantage over the speed of existing telegraph systems, but a saving in expense of attendance, as no key-operating, typing or other preparation of the message is necessary for transmission.

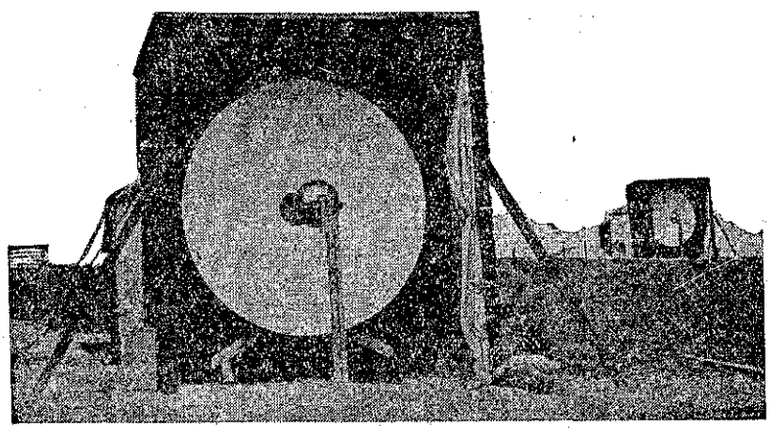
The above demonstration has clearly shown that wavelengths in the range between 10 and 100 centimetres can be used for commercial radio transmission. The importance of this fundamental advance can hardly be exaggerated, for even if they were made to differ in wavelength to the same degree as is now necessary with ordinary radio transmitters, room could still be found in this "No Man's Land" of radio to accommodate nearly a quarter of a million "micro-ray" transmitters without causing any mutual interference.

Still more astonishing is the fact that if it were physically possible to group such a vast number of stations all together in the same locality they would still work perfectly. It is, of course, inconceivable that such a close concentration will ever be required, but the point serves to show that in what may be termed the "micro-metric" wavelengths there will be no prospect of ether congestion for years to come. In fact, it has been calculated that the range of frequencies or wavelengths placed at our disposal by "micro-rays" working in the "micro-metric" wave band (between 10 and 100 centimetres) is nine times as great as in the whole of the rest of the ordinary radio field.

Apart from its obvious applications in a world communication network, the use of the "micro-ray," which is not affected by climatic conditions, such as fog, and rain, will very greatly extend the usefulness of lighthouses, especially at times when, owing to poor visibility, they are now least effective and most needed.

For maintaining secret communication between aircraft and the land, and between the various ships of a fleet at sea, the "micro-ray" offers fruitful possibilities. Another valuable application will be in the landing of aircraft in darkness or fog. It seems also to offer a sure means for ships to locate each other accurately in foggy weather.

While this successful demonstration proves the practicability of the "micro-ray," further refinements are being tested to prepare it for ordinary commercial application.



The "micro-ray" transmitter (front) and receiver (rear) on the cliffs near Dover.