



#### THE VATICAN SHORT-WAVE STATION:

*Some views of the new Vatican City short-wave station, which has a world-wide range. On the right the Pope may be seen performing the opening ceremony, with Marconi in the foreground on his left. A full description of the installation appears elsewhere.*

# The Story of Short Waves

by

R. J. Orbell, B.E.  
(ZL I AX)

**R**ADIO ENGINEERING, probably more than any other kindred science, has undergone radical changes during the past decade. One of the most outstanding of these undoubtedly has been the development of short wave operation. So far-reaching is the result of this discovery that not only is the old system rapidly being discarded in favour of the new for long-distance communication, but there is opened a vista of future developments which falls little short of staggering the imagination.

The whole aspect of radio has been changed. Enormous distances are being covered with almost unbelievable low power, and with apparatus costing only a fraction of the layout required for the earlier long wave transmitting equipment.

Just over ten years ago all long-distance radio was carried on in Morse code, on wavelengths varying between 8000 and 23,800 metres, the latter wavelength being that of the great station at Bordeaux, in France, built in 1920, which used a wavelength longer than any other station has ever done for commercial purposes. Enormous power was necessary to force signals through the almost continuous atmospheric interference which exists on those very long wavelengths.

Results were very uncertain as in many localities in the world the stations could be heard well only on rare occasions. The general trend was to longer and longer waves, as it was believed in those days that the longer the wavelength, the better would be the result. The shortest waves then in use were those around 600

metres, for ship to ship and ship to shore communication. Although this wavelength still holds and is specially suited for this purpose for short distances, recourse to shorter waves for longer distances between ship and shore has taken place recently. Following on the ever-growing interest in radio, many experimenters all over the world built apparatus of their

own for purposes of research. This was the case particularly in the United States, where no severe restrictions were placed on amateur experimenters, in contrast to conditions ruling in most other countries.

It became necessary, however, to introduce legislation in the United States to prevent interference between amateurs and commercial stations. To this end the amateurs were given all wavelengths below 200 metres for their own use, it being considered that 200 metres was too low to cause any interference with ships or commercial land stations. Incidentally, such "low" wavelengths were considered useless by the authorities.

All transmissions to date were conducted by the old spark system, with the exception of the high powered commercial stations which used high frequency alternators of the Alexanderson type or of the compensating wave arc system. Both of these latter systems operate more efficiently on extremely long waves. Valves of the de Forest audion type had been used for receiving purposes prior to the war, and improved (Continued on page 29.)