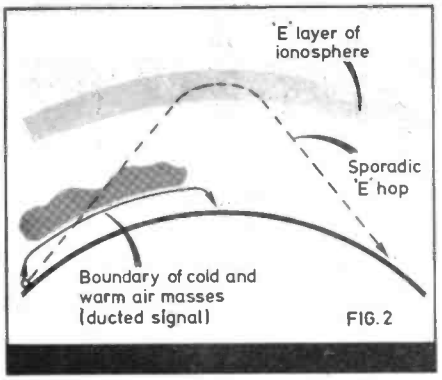


Ducting and sporadic E

and cooler air will extend normal VHF ranges.

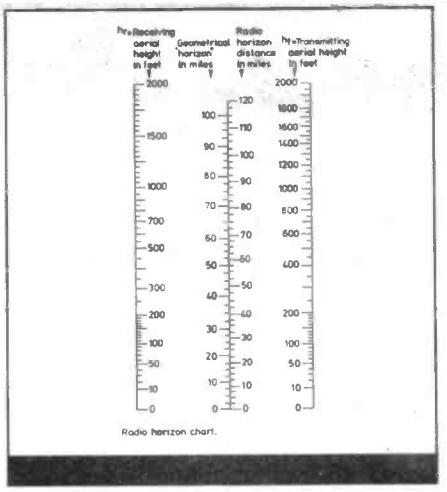
Radio signals on the 70cm UHF band will sometimes exhibit more tropospheric bending than those on 144MHz and thus travel greater distances.

Propagation of 2m signals can also occur, albeit spasmodically, when there are suitable patches of ionisation in the lowest layer of the ionosphere, the E layer. Multiple hop propagation by this mode over many hundreds of miles has been recorded.

Weather fronts

The first sign of likely DX conditions on the 144MHz band can be detected by monitoring the VHF/FM broadcast band, 88 to 108MHz, when Continental stations start to appear among the normally heard local stations. It may extend to interference with VHF and UHF TV reception, from European TV stations, with a possible apology from the announcer for the herring bone-like patterning that appears under these conditions. If that doesn't get you rushing off to the shack to check the VHF and UHF bands then nothing will !

Back to the weather chart. We are looking for a stable, high pressure area moving, very generally, from west to east bringing settled conditions. The conditions we want for DX-ing come in the period when this area moves away and is replaced by colder, more unsettled conditions, from the west or north-west, with the cooler air undercutting the receding warm air and creating the boundary conditions in the troposphere. In due course the VHF DXer brings together all the information that is already available from weather charts, including changes in barometric pressure, and his immediate weather condi-



Place rule between outer columns to compute radio horizon.

tioins such as wind direction, cloud formations etc sufficiently well to be able to predict VHF and UHF propogation conditions in the immediate future.

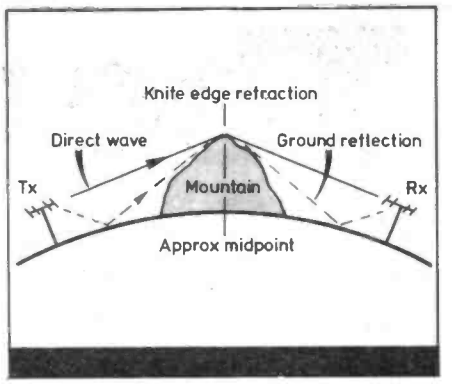
Troposcatter

One mode of communication using the troposphere is forward scatter whereby the signal, at high power levels, is beamed into the troposphere where it is scattered by normal atmospheric turbulence. The distant station, using very high gain antenna systems, can pick up signals of sufficient strength to permit commercial operation. Amateur applications of forward scatter are very limited because of the high power levels involved.

Yet another way of communicating on VHF involves using the stream of ionisation that is produced by a meteor when it enters our atmosphere, in effect a short-lived reflective layer. The transmitted information can be coded and sent at high speed to effect communication. Amateurs have done a lot of work in this area. For a full description see the article by John Matthews G3WZT in this month's issue of Ham Radio Today. It should be mentioned that scatter technique can also be employed using the ionosphere as well as the troposphere.

Auroral contacts

Storms in the ionosphere are well-known for the, sometimes, almost complete wipe-out of communications on the HF bands, and they may result in the appearance of an aurora, a curtain of flickering



Knife edge refraction remove.

coloured lights in the northern sky. This curtain of intense ionisation acts as a very good reflector of VHF signals. Communicating via the aurora means turning the beam towards the curtain regardless of the direction of the other stations, which are doing the same. However signals via the curtain are invariably rough in character and speech is frequently rendered unreadable. Resort to CW is often the only answer.

Knife-edge diffraction

Under certain conditions, it is possible for a ridge of hills or mountains to exhibit noticeable diffraction of a VHF wave travelling over the crest. This phenomena of wave propagation is known as knife-edge bending, and has been demonstrated for years with light rays. The transmission over a practical knife-edge diffraction path depends on the shape of the ridge, the distance separating the stations and the angle from the stations to the obstacle.

Moonbounce

Radio amateurs have been experimenting with lunar communication since 1953, (*moonbounce*). Moonbounce allows communication on earth between any two points that can observe the moon at a common time and has attracted the attention of growing numbers of VHF amateurs.

The earth-moon-earth (EME) path varies from 442,000 miles to 504,000 miles for a round-trip signal, which takes approximately 2.5 seconds to make the journey. Only 7 percent for VHF energy that strikes its surface is returned. In spite of this EME contacts are almost daily on 144 and 432MHz. For 144MHz moonbounce the total path loss is about 225dB.