heavy absorption with the consequent loss of all DX signals. The effect is very noticeable on the 80m band with the disappearance of DX signals as dawn arrives and the absorption becomes intense, only to decrease towards dusk and let the DX through again.

Periods of minimum absorption may be very short indeed and on the LF bands may be only a matter of minutes. Attempting to work Australia on 1.8MHz may mean months of listening for just the right conditions coupled with minimum absorption before success is obtained — even if there is a VK actually listening at the right time! So now we must look at the peculiarities of the lowest frequency bands, 80m and 160m, with the emphasis on the former.

80m Conditions

Those amateurs who are successful on the 80m band at working DX need to take into account other factors which are not quite so important on the higher frequencies. The DX does not come in fairly steadily for a matter of hours but often for just a few minutes, as we have just discussed, and a careful watch must be maintained not to miss the all too brief 'window'. Times of sunrise and sunset at both the transmitting and receiving points are all important as is the position of the line at the boundary of the light and dark hemisphere, sometimes referred to as the terminator or 'grey line'.

On east-west and reciprocal paths there are two very definite peaks in signal strength — when the eastern end of the path is enjoying the sunrise and at sunset at the western end of the circuit. The peaks also exist on north-west and south-east paths (and their reciprocal paths, of course) but do not have the same amplitudes.

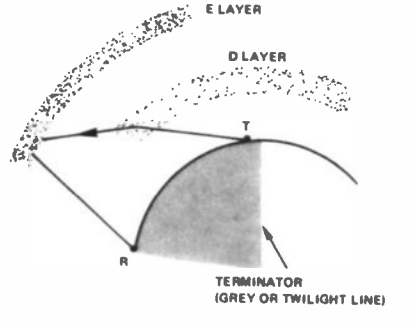

Fig.1 Here the D layer is shown established to the right, but not yet formed to the left, over that part of the earth's surface still in darkness. The signal from station T on the grey line is refracted rather than reflected by the D layer, travelling on to be reflected by the E layer and so on to point R

	Sun's angle	Length of day	MUF	D layer activity	QRN	Propagation possibilities
February-April	Inter-mediate	Approx equal night/day	Average	Inter-mediate	Average	Transequatorial NW/SE SE/NW
April-August	High	Long	High	High	Bad	N.Hemisphere bad (S.Hemisphere good)
August-October	Inter-mediate	Approx equal night/day	Average	Inter-mediate	Average	Transequatorial NW/SE SE/NW
October-February	Low	Short	Low	Low	None	N.Hemisphere E/W W/E (S.Hemisphere bad)

General summary of propagation possibilities over a period of a year on the 80m band for the northern hemisphere

Under these conditions the aforementioned paths are effectively in darkness and thus radio communication over them can take place. Propagation under these conditions is often referred to as being by the 'short' or direct path, particularly in the case of communication between Europe and Australia — the shortest distance from Europe to Australia being in a north *easterly* to south *westerly* direction around the globe (*if in doubt, look at our Great Circle Map in November's issue — Ed)*

If the opposite conditions exist, that is sunset at the eastern end or sunrise at the western end, then this implies the 'long path' possibility of a contact. It should be fairly obvious that suitable conditions for such a DX contact only exist for a short time, the twilight ring round the earth being the grey line. In recent years school-type globes of the earth have become available to radio amateurs which enable the grey line to be shown and greatly simplifying the task of determining the times when a particular DX path may be open.

The D ionospheric layer plays a big part in successful DXing on 80m. It comes into existence daily with the onset of daylight and solar activity and virtually absorbs signals on this band. With the approach of sunset the D layer starts to dissipate, allowing the 80m signals through to reach the E layer and be reflected back to earth allowing longer distance communications. From this it can be seen that during the local summer, when the daylight period is longest, the D layer persists longer and DX time is at a minimum. The converse conditions occur in local winter time when the sun's rays are weakest, persisting for only a comparatively short time when D layer absorption occurs.

This is illustrated in **Fig.1.** Here the D layer is shown established to the right, but not yet formed to the left, over that part of the earth's surface still in darkness. The signal from station T on the grey line is refracted rather than reflected by the D layer, travelling on to be reflected by the E layer and so on to point R.

The question of natural static (QRN) is very important on 80m, caused mainly by thunderstorm activity in that portion of the earth enjoying the summer season. Thus a UK station in winter may have little or no QRN while the station at the other end in, say, the southern hemisphere, may be suffering heavy QRN from summer storms, and be unable to copy Europe although propagation predictions may be favourable for that path.

UK amateurs have long envied the excellent DX conditions enjoyed by the amateurs in northern Scandinavia above the Arctic circle on the LF bands due to the almost 24 hours of darkness they enjoy in mid-winter time and the consequent absence of the D layer.

A summary of propagation conditions over a year on the 80m band is shown in the accompanying table. Much the same conclusions can be made for Top Band (160m) except that the successful DX communication is considerably more difficult! Openings are fewer and of shorter duration over DX paths, especially on the NW/SE and reciprocal paths, and the transmitter power that amateurs are permitted to use, particularly in the case of those in European countries, is consideraly lower than on 80m.