WORKING ME

We present a complete guide to one of the most demanding aspects of radio operation. The first part covers the basics of meteorscatter. The second part will describe operating procedure.

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With increased activity on 144MHz, meteor scatter is being used by an increasing number of people to work long distances. For those that do not understand this means of propagation fully or would like to improve their chances of completing QSO's by this mode, the following article will put you on the path to success by removing the factor of chance.

WHAT ARE METEORS

Meteors are small particles of various compositions which are classified into 3 main types.

1. Stony meterorites, composed mainly of silica and magnesium oxides.
2. Siderites, which contain mainly iron with a small percentage of nickel.
3. Siderolites, containing mineral and metallic elements in varying proportions.

Gases mainly carbon monoxide, nitrogen and hydrogen are also abundant and are liberated when the meteor vaporises during its passage into earths upper atmosphere.

The mass of these objects vary considerably and range between fractions of a milli-gramme up to 1 kilo-gramme.

The physical dimensions range from the size of a grain of sand to a tennis ball, but does not include the numerous micro-meteorites which have such small masses that they do not burn up but slowly settle down through the atmosphere as very fine dust like particles. It should be appreciated that this is a very generalised statement and objects outside these dimensions do exist, the point being made, is that in general, meteors are very small particles of material being attracted towards us by the earths gravity.

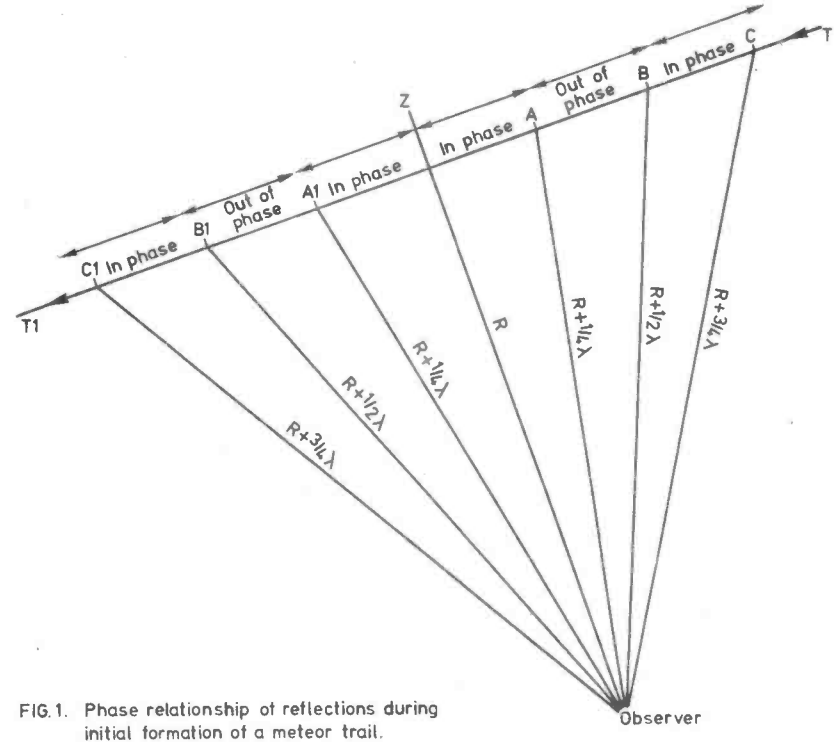

FIG.1. Phase relationship of reflections during initial formation of a meteor trail.

Many of these particles are believed to be of cometary origin and this is almost certainly the case for major showers.

METEOR TRAILS

As the meteor is attracted by the earths gravitational pull it begins to collide with molecules of air which become entrained in the surface. The heat produced evaporates atoms and it is the collision between the air molecules and the atoms moving off the meteorite which produce the familiar sight of a 'shooting star'.

This action produces heat, light and ionisation and in general takes place around the level of the E layer at a height of approximately 100Km above the surface of the earth.

Meteor trails extend between 15 and 50Km depending on the mass and whether they arrive vertically or at some other angle to the earths surface.

For the meteor scatter operator it is these 'tubes' of highly ionised particles that can be used to reflect radio signals very effectively at VHF frequencies, but only when an electrically conductive condition exists i.e. when free charge carriers (ions) exist.

By the time the meteor has reached an altitude of 70-80Km the air density has increased sufficiently to completely vapourise the particle, unless it is very large and survives to be found on earth as a meteorite.

METEOR TRAIL REFLECTIONS

As stated earlier it is the ionised trails produced by meteor's which