Tuesday Club Nature Notes

with Jan Flamank

HAIL

We tend to think of hail as winter phenomenon, as it is ice, but in fact we always have hailstorms in the warmer summer months, so why is this?

It is all because the big convective clouds reach their highest elevation in summer, when the surface is strongly heated by the sun, and also when they have the most moisture in them, so evaporation is at a high rate too. Both of these occur in the summer months. The higher the clouds go, away from the warm surface of the earth, the colder they become.

Cumulonimbus clouds, which produce hail, are convective clouds, formed by warmer, summer air pulling away from the surface of the earth, contrasting with the relatively much cooler air above the cloud. The clouds form and transport heat up into the atmosphere by the process of convection, and the strong updraughts of ascending air, and downdraughts, enable hail to form inside the cloud.

These clouds contain large water droplets and hail forms within the cloud from tiny ice crystals called graupel. The hailstones become bigger inside the cloud, due to the accumulation of supercooled water droplets as they are borne upwards on rapidly rising air. The hailstones have to build up sufficient layers of ice to be heavy enough to fall out of the cloud onto earth. They do this by moving up and down in the cloud on the water- rich updraught, adding icy layers to themselves. It is possible to count the ice layers in a large hailstone and have an idea of how many times it moved up and down in the cloud.

So, the next time we have a summer hailstorm, think of the tiny ice crystals becoming larger as they move up and down in the cloud, encountering very cold water droplets and making extra layers of ice, prior to making headlines in the local news. It is a summer weather event to marvel at - buy try to avoid being out in it, as they can hurt if they land on your head!