

The Development of a Thunderstorm *Howard Bridgman*

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Introduction

The purpose of this display is to explain the **development of a local thunderstorm** using philatelic example for illustration.

Thunderstorms can have spectacular visual displays and be very destructive. They also being important precipitation for plant and crop growth. Lifetime averages 15-20 minutes. *Please read across left to right and down the page.*



Shortwave radiation from the sun heats the earth's surface, especially in summer. This heat is then transferred to surface air at ground level.



The hot air rises from the earth's surface, cools and relative humidity reaches 100%. Small clouds (**cumulus**) form. The flat grey bottom indicates the height where cloud formation begins.



Some cumulus clouds begin to grow rapidly through intense vertical air movement (**convection**). These **congestus** clouds can extend to several thousand metres in altitude. Cloud droplets begin to grow to raindrops.



The most intense convection creates massive vertical cloud development, often to the stratosphere (10+ KM altitude). The top of these **cumulonimbus** clouds is an icy anvil in appearance. Large water and ice droplets form.



Water-filled globules can extend downwards from the underside of the cloud. These are called **mammatus** (after cow's udders). They eventually burst, creating a rapid down-rush of rain.



Called "raining cats and dogs" colloquially, thunderstorm rain is accompanied by very intense wind, sometimes hail, and very stormy weather for a short period of time. Local flash flooding at the surface can occur.



Strong differences in electric charges within the thunderstorm cloud, and also with the ground, create spectacular **lightning**. **Thunder** is caused by the "explosion" as lightning rapidly heats the air.



Under very extreme conditions, the thunderstorm can spawn a **tornado**, a very destructive rotating pendent of very high winds which moves rapidly across the ground. Anything the tornado encounters is destroyed or severely damaged. Loss of life in communities can be high during a tornado episode.