CHAPTER 5

CLOUDS

INTRODUCTION

Clouds are collections of water droplets or ice crystals, or combination of these two states of water, suspended in the atmosphere. A knowledge of the many types of clouds and their occurrence provide a valuable source of information to the seafarer in forecasting the weather.

CLOUD TYPES

The shapes of cloud within the troposphere may be *stratiform* (flattened or layered), *cumuliform* (heaped), *cirriform* (hair or thread-like), or a combination of these. There are ten basic genera or characteristic forms, and further subdivision into species and varieties can be made. The internationally agreed classification of the ten genera is related to the height of the cloud base above the surface (Table 5.1).

Table 5.1 Cloud genera

Cloud base	*Genera*	*Abbreviation*	*Height of base in kilometres*		
			Tropics	*Mid lats.*	*High lats.*
HIGH	Cirrus Cirrostratus Cirrocumulus	Ci Cs Cc	>6	> 5	>3
MEDIUM	Altostratus Altocumulus	As Ac	2–7.5	2–7	2–4
LOW	Stratus Stratocumulus Nimbostratus Cumulus Cumulonimbus	St Sc Ns Cu Cb	<2	<2	<2

"Alto" identifies the medium level clouds, and "nimbus" implies rain, but other forms of precipitation are possible.

Table 5.2 sets out the salient features of each genus.

ADIABATIC LAPSE RATE

Cloud formation is mainly the result of air ascending and cooling adiabatically. When a parcel of air ascends, the pressure exerted on it by the surrounding atmosphere decreases, so allowing the parcel to expand. In order to do so it requires energy which is derived from the parcel itself, and its temperature therefore decreases. Since air is a poor conductor, it is assumed that no energy is exchanged between the air parcel and the surrounding atmosphere. This process, in which no heat enters or leaves the system, is termed *adiabatic* from the Greek word meaning "impassable". When an air parcel descends, the reverse