shells of mollusks, the calcareous tubes formed by annelid worms, and the skeletons of bryozoans.[8]

It is thus obvious that during the formation of the chalk beds each hard layer was exposed to the sea water long enough to be bored by organisms, and then encrusted by the animals which attached themselves. After the encrusting organisms of any particular surface had built their structures, the layer was finally covered over with a deposit of soft chalk upon which another hard layer was then formed. The chalk, as well as the hard layers, is highly fossiliferous. The chalk itself is composed primarily of carbonate ooze from the ocean bottom. A high percentage of its composition consists of the fossilized shells and calcareous cell walls of floating ("pelagic") marine organisms of various kinds.[9] The loose, uncemented deposits of these surround and enclose the fossilized encrusting organisms which lie attached to the hard layers, leaving us a clear record of the biological growth which accompanied the formation of the chalk-bed series. This is of course also a record of the passage of many thousands of years of time, even in the case of the lesser chalk-bed deposits.

Plants That Make Rocks

We have previously made several brief references to the participation of algae in the formation of certain limestone and dolostone layers. Some very small filamentous algae growing in layers on beaches, such as in the Persian Gulf, collect and bind fine grains of carbonate sediment, forming algal mats which later become cemented into laminated rock. Such hardened algal-mat layers are very frequently found in oil-bearing strata, as in the Rainbow area in Canada. Algal limestone similar to this will be discussed below, under "Algal Layer-built Rocks." Some of the larger forms of algae, such as Halimeda and Penicillus, secrete great quantities of plate-like particles and minute needles of calcium carbonate which fall to the bottom. These make up a very significant part of the sediments which eventually become limerock on the shallow sea floors. Such algal components are frequently found in deeply buried, as well as surface, deposits of limestone. Still other kinds of algae, mostly belonging to the group we call the "red algae," build calcareous encrusting layers over dead or broken masses of coral in reef areas, as was mentioned in Chapter 6.

In the deposits of ancient limestone on the continents we find the record of all of the above types of algal building processes. In some formations of these rock layers the fossilized algal structures are very pronounced and obvious when observed with the naked eye or with a hand lens; for others, a microscope of higher power must be used. Here we wish to briefly describe two of the more readily visible types of algal remains which are fossilized in ancient deposits of limerock.

The first of these is what is called the "phylloid" algal limestone. This is limestone in which many fossilized, leaf-like blades of lime-secreting algae have been preserved. (The word "phylloid"