## CLUES IN THE ROCKS

# INTRODUCTION TO PALEOECOLOGY

*Go to Nature. Take the facts into your own hands. Look and see for yourself.*

Louis Agassiz

*It is an old maxim of mine that when you have excluded the impossible, whatever remains, however improbable, must be the truth.*

Sherlock Holmes
The Beryl Coronet
(Sir Arthur Conan Doyle)

### Introduction

Paleocommunities of fossils can provide a wealth of information about past environmental conditions. The distribution of various species is strongly influenced by physical factors in the environment. Factors such as salinity, water temperature, light, availability of nutrients, oxygenation, agitation of the water, cloudiness/clarity of the water and, the nature of the substrate (sediment size and type) can exclude organisms from particular environments and cause them to flourish in other environments. Of these factors, only substrate is directly recorded in the rock. However, clues to the other factors can be derived from the character of the rocks or from the organisms themselves by analogy with similar living organisms.

### Assignment

For **each** of the **four assemblages** of fossils provided (numbered 1-4), make careful observations and use your General Guide to Fossil Identification and Paleoecology to:

1) Identify the organisms present (be detail-oriented; not just brachiopods, but 4 different brachiopods)

2) Rank the taxa in terms of relative numerical abundance (e.g., corals predominate, followed by fewer brachiopods and rare echinoderms)

3) Describe diversity of the community (Very Diverse (>8 species or >4 larger taxonomic groups); Diverse (4-7 species or 3-4 larger taxonomic groups); Low Diversity (<4 species or 1 or 2 larger taxonomic groups)).

4) Reconstruct the ecological roles (e.g., filter feeders, sediment feeders, scavengers, predators, etc.) of each taxon and then infer how food resources were distributed in the environment.

5) Evaluate the environmental requirements of each taxon (What were their preferences in terms of oxygenation of water, agitation of water, clarity/cloudiness of water, sediment type (coarse-fine), salinity of water, etc.).

6) Assess the overall aspect of assemblage. Does it represent a life assemblage (buried alive), death assemblage (obviously transported, disarticulated, abraded post-mortem) or mixed (some elements of each) assemblage? Support your characterization with specific evidence.

After gathering these data on each assemblage and making specific inferences regarding ecological settings and environmental conditions, suggest a specific environment for each assemblage where the inferred conditions were likely to have existed (e.g. reef, river, shelf, tidal flat, beach, lagoon, flood plain, desert, etc.).