THE TAPHONOMY OF BIRDS

DAVIS*, Paul G., Department of Geology, Wills Memorial Building, University of Bristol, Queens Road, Bristol, Avon BS8 1RJ. ENGLAND.

The taphonomy of birds can be investigated with actualistic studies complemented by reviewing Konversat Lagerstätten such as Messel, Green River and Solnhofen.

Two field sites were chosen in southern Florida: 1, a freshwater (16-23 ppt salinity) environment in which biogenic carbonate muds were being deposited and 2, a marine (30-34 ppt salinity) environment in which pyritous carbonate muds were being deposited. Ninety-six specimens (36 genera, 40 species) were used in this study (these were obtained from a wildlife centre where they died of natural causes). Experiments were set up in both marine and freshwater sites in the following categories: large protected, unprotected; small protected, unprotected. Protected specimens were placed in metal cages coated with small mesh ($1.5mm^2$) nylon netting.

The specimens were allowed to degrade under natural conditions. The following variables were recorded daily over a seventy day period : air and water temperature, humidity, rainfall, wind and current speed and direction, salinity, dissolved oxygen content, pH, and water depth. Specimens from each of the eight categories were sampled at day 1, 4, 7, 11, 28, 56, and 70.

Scavengers play a major role in the early taphonomic processes. Unprotected specimens were rapidly removed from the study area by large predators such as alligators (*Alligator mississippiensis*) and American crocodiles (*Crocodylus actus*), and Turkey vultures (*Cathartes aura*). Even protected specimens were prone to attack by more "intelligent" large scavengers such as racoons. Smaller predators include crayfish in the freshwater site and the carnivorous gastropods (Crown conch) in the marine environment . The Crown conch was observed to be a voracious feeder and large numbers rapidly strip all flesh from any carcass within reach of the bottom.

Decay proceeds rapidly in the warm waters of the field sites. Within the carcasses temperatures approach optimum bacterial temperatures and large bacterial colonies form within muscle blocks after only one day. The initial decay of the muscle fibres is also rapid (one day) as the muscle myofibrils start to break into short lengths and the myoseptum starts to disintegrate, and has totally disappeared after seven to fourteen days (depending on the initial mass of the bird).

From graphs showing plots of percentage weight loss (weight loss as a percentage of original weight) versus time decay can be seen to follow an exponential curve ie. most rapid decay occurs early (as soft tissues decay) then weight loss slows down (after 10 days for small specimens and 28 days for large specimens) as by this time nearly all but the most resistant soft tissues have decayed and the weight loss is due to the removal of skeletal matter to the sedimentary record. Feathers are resistant to the initial stages of decay and the primary and secondary feathers remain attached to the wing bones for up to twenty-eight days even when the soft tissues have been totally removed.

The results of the decay experiments have provided directly comparable specimens to those that can be found within the fossil record. This comparison of fossil and modern analogues allows a series of taphonomic thresholds to be defined in the fossilisation of birds.