BIRD NOTES by Rick Pyeritz

"……it has been suggested that our knowledge of bird evolution is presently limited more by the scarcity of paleornithologists than by the lack of fossils."
---- John Faaborg

When considering the above quote, what complicates the matter is that most paleornithologists do not agree with each other. One bit of science that is generally agreed upon (except by the creationists) is that birds evolved from reptiles. There are many similarities between birds and reptiles as well as differences. I will not discuss these in depth in this short essay, except to stress that the most important difference is that birds have feathers. Feathers are unique to birds in the animal kingdom. Their structure, formation and coloration will be discussed in a future article.

In 1861, a fossilized single feather in a piece of quarried limestone from Bavaria followed by the discovery a few months later of a complete skeleton of a small reptile like animal with feathers attracted the attention of Hermann von Meyer. Von Meyer was familiar with Charles Darwin's book On the Origin of Species by Means of Natural Selection published in 1859, just two years prior to the Bavarian find. He realized that he had in his possession a link between birds and reptiles. The fossil was named *Archaeopteryx (archios, a*ncient; *pteryx,* wing) *lithographica* . Another complete skeleton was discovered in another quarry in Bavaria in 1877 which revealed the reptilian features of a toothed jaw, long bony tail, clawed fingers and abdominal ribs in finer detail. The fossil, also, showed a heavily feathered tail and wings as well as the presence of contour feathers. The wing feathers were asymmetric which is necessary for flight. Both fossils were obtained from limestone of the late Jurassic period 135 to 155 million years ago. These discoveries were some of the most fortunate finds in the history of paleontology as was eloquently stated by Charles Marsh, a leading American paleontologist:

"The class of Birds and Reptiles, as now living, are separated by a gulf so profound that a few years since it was cited by the opponents of evolution as the most important break in the animal series and one which that doctrine could not bridge over. Since then, as Huxley has clearly shown, this gap has been virtually filled by the discovery of bird-like reptiles and reptilian birds. Archaeopteryx of the Old World……is the stepping stone by which the evolutionist of today leads the doubting brother across the shallow remnant of the gulf, once thought impassable."
----Charles Marsh

Although the link between reptiles and the early birds became widely accepted, the common ancestor of birds and reptiles was, and continues to be, hotly debated. One of the problems is that birds are relatively small with light, hollow bones, and they decompose quickly; therefore, they do not fossilize well, leaving an incomplete fossil record. Although incomplete, it is still a record. What has been determined from examination of these old bones? In 1987 a fossil was found in China which showed skeletal changes which would increase the animal's ability to fly and perch. It was named *Sinomis santensis*. This fossil was younger than *Archaeopteryx* and had less reptilian features. The mass extinction of life on earth, caused by an asteroid impact 66 million years ago, wiped out the primitive bird-like reptiles leaving the more advanced forms (those with more bird-like characteristics) to fill the ecological niches opened up by the extinct species. Approximately 56 million years ago, there was an explosion of diversity found in the fossil record in the Green River Formation of the western United States. New species continued to evolve as a result of geographic isolation due to continental drift, island formation and climate change. Those species which could not adapt to these changes became extinct. While these changes exert their pressure over millions of year, human activity may cause species to become extinct at a rapid rate. An example of this would be the introduction of the brown tree snake in the 1940's to the island of Guam which caused the extinction in the wild of the Guam rail and the Guam Micronesian kingfisher.

Species formation and extinction will be episodically discussed in future issues of **Bird Notes.** Comments, questions and/or suggestions about the current article may be sent to me at eapyeritz@gmail.com.