et al. 1982), the details of which plant species are particularly vulnerable or their rates of disappearance under goat grazing are unknown.

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A new genus for *Sula abbotti*

by Storrs L. Olson and Kenneth I. Warheit

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Abbott's Booby *Sula abbotti* was described from a single specimen taken on Assumption Island, western Indian Ocean, in 1892 by W. L. Abbott (Ridgway 1893). Although once probably found on other islands in the Indian Ocean (Nelson 1974, Bourne 1976, Stoddart 1981) the species is now extinct everywhere except at Christmas Island, south of Java, where Nelson's (1971) study of its behaviour showed it to differ markedly from other species of Sulidae in many respects, and to have a much larger and heavier egg, especially in relation to body size. Bones from Polynesian archaeological sites on Tikopia (a Polynesian outlier of the Solomon Is.) and in the Marquesas show that birds closely related to *Sula abbotti* were widely distributed in the Pacific into very recent times (D. W. Steadman, D. Pahlavan and S. E. Schubel). In addition, it has been suggested that a relict population of a species similar to Abbott's Booby may still exist on Cocos Island in the eastern Pacific (Slud 1967, Nelson 1974).

Our studies of the osteology of the Sulidae confirm the distinctiveness of *Sula abbotti* and show it to be the primitive sister-group of all the remaining Sulidae. Because the fossil record shows that the divergence between gannets (*Morus*) and boobies (*Sula* sensu stricto) had already taken place by the middle Miocene, some 16 million years ago, we must assume that the divergence between *Sula abbotti* and the remaining sulids is older still.

Sula abbotti possesses numerous derived characters within the Sulidae that, by themselves, would not necessarily require the erection of a new genus. However, because the species lacks other derived characters that are shared by *Morus* and *Sula*, it forms a separate primitive clade, and thus, if *Morus* and *Sula* are each recognized at the generic level, which we believe is the correct treatment, then a new genus is needed for *Sula abbotti* as well. The purpose of this note is to make a new generic name available for use in pending studies that include a revision of all living and fossil Sulidae (Warheit in prep.) and the possible description of new species in this group based on archaeological material (D. W. Steadman in prep.).

The following are some of the derived characters that are shared by *Morus* and *Sula* that are not found in *S. abbotti*: the postorbital processes of the skull are reduced and bifurcated (*S. abbotti* retains the primitive long, pointed, ventrally oriented condition); the temporal fossae meet along the midline and are not widely separated as in *S. abbotti* (the polarity of this character has not yet been resolved and may perhaps be derived in *S. abbotti*); the neck of the coracoid between the coraco-humeral surface and the bicipital pit is laterally compressed, but is broad in *S. abbotti*; the brachial depression of the ulna is pneumatic, as opposed to non-pneumatic in *S. abbotti*; and the surface medial to the ligamental tubercle at the distal end of the radius in caudal aspect is pneumatic, but non-pneumatic in *S. abbotti*.

We propose the name

Papasula genus nov.

Type species. Sula abbotti Ridgway 1893, the only included species as yet.

Diagnosis. The following diagnostic characters of the species are derived within the family Sulidae. Skull: the paraoccipital processes (Owre 1967) of the exoccipital are broad and bilobed, with the scars for M. rectus capitus widely spaced, producing an irregularly shaped basioccipital with an unusual placement of the pneumatic foramina, compared with the pneumatic condition in *Morus* (pneumaticity lacking in *Sula*). Furcula: the medial surface of the clavicles is angled medially in anterior view and the furcular process is postero-dorsally directed (both characters convergent with *Sula sula*); the coracoidal processes are longer, and more slender and pointed than in *Morus* or *Sula*. Scapula: the dorsal surface of the furcular facet is thin, excavated, and concave. Coracoid: the coraco-humeral surface (Howard 1929) from the head to the bicipital pit is horizontal or flat, compared with the angled surface in *Morus* and *Sula*; the furcular facet in medial aspect is swollen and convex

with no ridge on the brachial tuberosity. Humerus: the shaft is laterally compressed, especially from mid-shaft to the brachial depression; the entepicondyle is long and narrow and projects distally to the level of the condyles. Ulna: the shaft is very long and slender and the dorsal surface of the carpal tubercle is pneumatic (non-pneumatic in *Morus* and *Sula*). Radius: the humeral cotyla is compressed into an oblong or elliptical shape. Femur: the distal end is very broad and flat. Tibiotarsus: the distal end of the fibula is swollen, producing an external bulge on the lateral surface of the external (lateral) condyle. Tarsometatarsus: the anterior face of the shaft is very deeply excavated and the inner trochlea lacks the distinct medial groove of other sulids.

Etymology. Greek *papas*, father, plus *sula*, the type genus of Sulidae. The name refers both to the patronym of the type species (abbot, from Hebrew, *abba*, father) and to the fact that this genus represents an ancient lineage in the family.

Material examined. Two skeletons of *Papasula abbotti* in the collection of the National Museum of Natural History, Smithsonian Institution (USNM 560682, USNM 560683). The first of these is a juvenile with the bones not quite fully ossified; the other is fully adult. Skeletons of all other species of Sulidae were also examined.

Remarks. The long, narrow wings of *Papasula abbotti* in life (Nelson 1971) are reflected in the osteology of the humerus and ulna as well. The pelvis is quite short and broad, being similar only to that of *Sula sula* within the Sulidae. It is not clear at this point, however, whether this is a convergent similarity or a shared primitive feature. The characters of the tibiotarsus and tarsometatarsus mentioned in the diagnosis are very distinctive and have proved quite useful in identifying archaeological material (D. W. Steadman). One feature of *Papasula abbotti* is absolutely unique and, if constant, would distinguish the species from all other birds. In the one adult skeleton, the sclera of both eyeballs, including the ring of sclerotic ossicles, is entirely ossified so as to form a hollow sphere with only a circular opening for the cornea and a smaller foramen for the optic nerve. Unfortunately, this element was not included with the juvenile specimen. We have not observed a similar condition in any other bird and we have no idea what it means.

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Gynandromorphism in the Pink-browed Rosefinch *Carpodacus rhodochrous*

by Per Alström and Urban Olsson

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On 28 April 1983 in Dachigam Wildlife Sanctuary, Kashmir, when observing a flock of the sexually dimorphic Pink-browed Rosefinch *Carpodacus rhodochrous*, our attention was drawn to a single bird sitting in a bush near the flock. We had previously seen and identified it as a female or, possibly, second calendar-year male, and had watched it move about in the bush for a while. Yet, on turning to look at it again, the same bird showed adult male plumage.

It turned out that the bird was divided sagittally, being in female-type plumage on the right half of the body and adult male on the left. Although we had no opportunity to examine the bird in the hand, the line of division seemed well defined, and we could see no flaws in the plumage on either side. The bird disappeared after a few minutes and could not be relocated.

Gynandromorphism has been recorded in a number of passerine species and also in some non-passerines, including the Pheasant *Phasianus colchicus*, Flicker *Colaptes auratus* and Budgerigar *Melopsittacus undulatus* (Harrison 1985). According to Laybourne (1967) it is rare that the male plumage is on the left side of the body. Kumerloeve (1987) discusses the condition, citing all recorded cases known to him.

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