

A MIOCENE GULL FROM NEBRASKA

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IN collections made by the University of California Museum of Paleontology in 1933 in northern Nebraska is a portion of a humerus of an extinct gull. The bone was found in the Niobrara River Zone, locality V3306, known as Little Beaver A. This locality is in the northeast corner of the northeast quarter of sec. 18, T 34 N, R 26 W, Cherry County, Nebraska. The fossil was discovered on the Niobrara Game Preserve in a small sandy exposure about 75 feet east of a dry north-south ravine which drains into Little Beaver Creek. The matrix is a gray sand which forms a bed situated 65 feet above the Brule (?) Clay. This bed is Upper Miocene, as indicated by the associated mammalian genus *Monosaulax*, a beaver, which is restricted to that horizon.

The new gull from Nebraska may be known as

***Gaviota niobrara* new genus and species**

Type.—Distal end of left humerus, about one-fourth complete, no. 30933 Univ. California Mus. Paleontology, field no. R. A. S. 680, from Upper Miocene, Niobrara River Zone, Cherry County, Nebraska. Collected by R. A. Stirton, May 20, 1933.

Characters.—Size of humerus as in *Larus hyperboreus*, but differing as follows: ectepicondylar spur shorter, with narrow base, and situated farther distally; axis of spur projects at less-acute angle to shaft. Olecranal fossa with a distinct, deeply excavated pit. Scar for attachment of pronator brevis located on medial side of ridge bordering impression of brachialis anticus rather than on summit of ridge as in *Larus hyperboreus*.

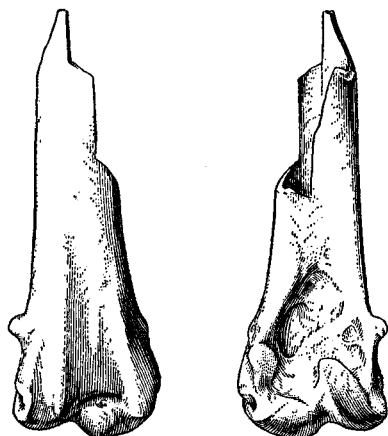
Measurements.—Transverse diameter across condyles, 19.7 mm.; distance from proximal base of ectepicondylar spur to most distal point of external condyle, 14.9; transverse diameter of shaft across proximal base of ectepicondylar spur, 15.2.

The condition of the ectepicondylar process or spur is fundamentally different from that in modern larids. Not only is the spur shorter, but it is placed farther distally on the shaft. This condition is summarized in the following table of comparisons. The transverse diameter across the condyles has been used as an index to the general size of the bone. The distance from the proximal base of the ectepicondylar spur to the most distal point on the external condyle has been divided by the transverse diameter in order to derive a ratio indicative of the relative position of the spur.

On the basis of the distal position of the ectepicondylar spur alone, the fossil seems to be close to the jaegers and to the shorebirds, such as *Numenius*. In terns the spur is placed farthest proximally. From the shorebirds, as exemplified by *Numenius*, to the terns there is a gradually changing ratio which indicates a shift proximally in the

position of the spur. An accompanying change, but one difficult to measure, occurs in the length of the spur. This follows the same trend, the process being shortest in the shorebirds and longest in the terns. In both of these characters the gulls are intermediate.

In order to determine the function of the ectepicondylar spur and the effect of changing its position and length, the wing of a Ring-billed Gull (*Larus delawarensis*) was dissected. The spur is the origin of the M. extensor metacarpi radialis longus, which is inserted on the extensor attachment of the proximal end of the carpometacarpus (metacarpal I). This muscle extends the distal segment of the wing. If the origin of this muscle is moved proximally from the



TEXT-FIG. 1.—Distal end of humerus of *Gaviota niobrara* (type, no. 30933 Univ. California Mus. Paleontology). Natural size. Anconeal aspect at left; palmar at right.

joint, an automatic extension of the distal part of the wing takes place whenever the elbow joint is straightened by the M. triceps. This is accomplished chiefly through tension put on the extensor metacarpi and its tendon, and little or no active contraction by this muscle itself is necessary. Thus a smaller muscle is sufficient to carry out the usual extensor actions and a saving in weight in the radial segment of the wing is accomplished. The same effect results from the lengthening of the spur. Since in the extinct *Gaviota* the spur is situated relatively far distally and in addition is the shortest spur of those examined, its condition appears to be primitive and suggests that the later trend of modification has been toward the development of a longer, more proximal ectepicondylar spur with attendant increase in efficiency.

The attachment of the pronator brevis is situated on the medial

side of the ridge bordering the scar of the brachialis anticus in *Gaviota*. This same condition is found in *Numenius* and other scolopacids. In the gulls and jaegers the scar of the pronator brevis is on the summit of the ridge.

Thus two characters, the positions of the ectepicondylar spur and the scar of the pronator brevis, point to relationships with the Scolopacidae. The much greater excavation of the area of attach-

<i>Species</i>	<i>Number of specimens</i>	<i>Average distance from base of spur to end of condyle (1)</i>	<i>Average width across condyles (2)</i>	<i>1 : 2</i>
<i>Gaviota niobrara</i>	1	14.9	19.5	.76
<i>Numenius americanus</i>	4	10.8	13.8	.78
<i>Recurvirostra americana</i>	5	8.3	10.4	.80
<i>Stercorarius longicaudus</i>	1	9.8	11.0	.89
<i>Stercorarius pomarinus</i>	1	11.9	14.6	.82
<i>Larus hyperboreus</i>	2	18.0	19.7	.91
<i>Larus glaucescens</i>	11	15.8	18.0	.88
<i>Larus occidentalis</i>	11	14.6	16.7	.88
<i>Larus argentatus</i>	7	15.6	17.7	.88
<i>Larus californicus</i>	26	13.4	14.6	.92
<i>Larus delawarensis</i>	12	12.2	13.2	.92
<i>Larus canus</i>	10	11.3	12.0	.94
<i>Larus philadelphia</i>	6	8.8	9.4	.94
<i>Larus atricilla</i>	1	10.4	11.3	.92
<i>Larus heermanni</i>	11	11.5	12.9	.89
<i>Rissa tridactyla</i>	9	11.8	12.9	.92
<i>Xema sabini</i>	4	9.1	9.6	.95
<i>Sterna forsteri</i>	10	8.6	7.6	1.13
<i>Sterna antillarum</i>	1	5.3	4.6	1.15
<i>Gygis alba</i>	1	7.7	7.0	1.10
<i>Thalasseus maximus</i>	3	13.5	12.3	1.10
<i>Thalasseus elegans</i>	3	10.8	9.6	1.12
<i>Hydroprogne caspia</i>	2	15.2	14.0	1.09
<i>Chlidonias nigra</i>	5	6.5	5.6	1.16

ment for the brachialis anticus, however, shows affinities to the larids. In the scolopacids (and jaegers) the brachialis scar is represented by a shallow depression and not by a deep excavation as in both *Gaviota* and modern gulls. In other characters of general configuration the fossil resembles the configuration of gulls in more respects than it does that of the shorebirds. Thus it seems that in *Gaviota* we have a form which in exhibiting characters of both groups may indicate that the two were more closely related in Miocene times and have diverged since then.

Fossil gulls are surprisingly rare in North America. Shufeldt has

described three species of extinct gulls from this continent. *Larus oregonus* and *Larus robustus* (Amer. Nat., 25: 819–820, 1891) are from the Pleistocene of Oregon. *Larus pristinus* (Trans. Connecticut Acad. Arts Sci., 19: 54, 1915) is based upon a fragmentary tibiotarsus from the John Day Oligocene (?), and is of doubtful allocation.

Four species of fossil birds from Old World Oligocene deposits have been allocated to the genus *Larus*. *Larus desnoyersii* (Milne-Edwards, Oiseaux Fossiles de la France, 1: 344–349, 1867) is much smaller than *Gaviota*, with a width of 11.0 mm. across the distal condyles. The excellent illustrations (op. cit., atlas, pl. 54) show *Larus desnoyersii* to have but one deep fossa in the head of the humerus. The genus *Larus* is characterized by having two such fossae. In this respect *Larus desnoyersii* is similar to the Scolopacidae and Stercorariidae, which have but one fossa.

Larus elegans (Milne-Edwards, op. cit., 1: 350–357; atlas, pl. 57) is again much smaller than *Gaviota* (7.0 mm. across the condyles) and has a single fossa in the head of the humerus.

Larus totanoides (Milne-Edwards, op. cit., 1: 358–359; atlas, pl. 57) has a condylar width of 7.0 mm. The head is not preserved, but the angle of the external condyle to the axis of the shaft is less acute than in *Larus* and more like that in the Scolopacidae.

Although Milne-Edwards was aware of these departures from the typical larid condition, he undoubtedly was influenced in allocating these species to *Larus* by other associated skeletal parts which were more gull-like than the humeri.

The fourth species was described by J. Van Beneden (Bull. Acad. Roy. Belg., (2) 32: 256–261, 1871) as *Larus raemdonckii*. Judging from the illustration (p. 260) this bird appears to be allied to the Procellariiformes and probably should be placed in that group.

From the Miocene of Argentina, Mercerat (An. Soc. Cient. Argent., Buenos Aires, 43: 237, 1897) described the genus *Pseudosterna* which he placed in the Laridae. This genus is characterized by more distal placement of the ectepicondylar process than in modern *Larus*. This indicates a condition similar to that found in *Gaviota*, but the relative size of the process itself is described as the same as in *Sterna*. This would make the process larger than in *Gaviota*. In general size *Pseudosterna* was a much smaller bird, measuring 11.5 mm. across the condyles as compared with 19.5 mm. in *Gaviota*. Since no illustration accompanies the description of *Pseudosterna* it is difficult to evaluate the characters accurately, but it seems extremely unlikely that *Pseudosterna* and *Gaviota* are synonymous.

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