

I. *Triceromeryx*,

an American Immigrant to Europe

by

Birger Bohlin

The first attempt to refer an Eurasiatic species to the peculiar horned ruminants so abundantly represented in North American Late Tertiary and Pleistocene deposits but with a single surviving species, the pronghorn, was made by YOUNG in 1937. Later, in 1939, TEILHARD demonstrated that the horn described by YOUNG as *Heterocemas simpsoni*, must belong to the genus *Lagomeryx*. But at the same time he asks: "What is the true zoological position of *Lagomeryx*?" This might imply that in his opinion the possibility of an American relationship of *Lagomeryx* is not altogether excluded.

After the discovery in Spain of a three-horned ruminant closely resembling the North American *Dromomerycinae* the presence in Eurasia of ruminants of North American origin has become a certainty. The Spanish species, *Triceromeryx pachecoi*, was preliminarily described (1946) by VILLALTA, CRUSAFONT and LAVOCAT, and later, in greater detail, by CRUSAFONT in his excellent monograph on the Spanish *Giraffidae* (1952). It was at first thought to be a craniocerotid (*vide* also VIRET 1946).

Taking into consideration the enormous distance from North America to Spain across the Eurasiatic continent and the impossibility of an immigration from the west, however, CRUSAFONT arrives at the conclusion (1952, p. 63) that *Triceromeryx* is an endemic Spanish form developed from palaeomerycid ancestors and that the similarity with *Cranioceras* is rather "un fenomen de convergencia" than "un parentesco directo".

But if we compare *Triceromeryx* and *Cranioceras*, *i.e.* the craniocerotid that most closely resembles *Triceromeryx*, — a comparison that was also carried out by CRUSAFONT — we find that the agreement is most remarkable, and one must ask: Is such a high degree of convergency possible?

It is true that the shape of the horns in the two genera is different. In *Triceromeryx* the supraorbital horns are short and the unpaired posterior horn is forked. This difference, however, is slight in comparison with the difference between the extremes among North American fossil ruminants. And in the most essential character, the position of the horn, there is no

discrepancy. Especially remarkable seems to me to be the identically formed extension onto the base of the occipital horn of the posterior ends of the temporal fossae, a fact stressed by Dr. CRUSAFONT.

The only difference worth noticing between the teeth of the two genera, is the comparatively long premolar series in *Triceromeryx*, which is above all due to the long and complicated P_2 . To judge from drawings in the papers by CRUSAFONT and FRICK this genus is more brachyodont than *Cranioceras*. These two characters might be correlated (cf. BOHLIN 1935, tables of measurements on pp. 100—105). Other characters, development of spurs, median pillars, "palaeomeryx fold", fusion of tooth elements and so on, are in the ruminants, at least the earlier ones, variable to such extent that no attention need be paid to minor differences between the teeth of *Triceromeryx* and *Cranioceras*, most of these differences being such of degree. A comparison with *Palaeomeryx* would certainly show as good an agreement, as is evident from Dr. CRUSAFONT's paper, in which the comparisons there made turn out alternately in favour of one or the other of *Cranioceras* (or other North American forms) and *Palaeomeryx*.

At first I was shocked by the thought of such wide-range migration, forgetting at the time that the camels have achieved the same; — I mention the camels as being a mainly American group of which a few stray members emigrated and reached as far as to Europe and Alger. The European localities for fossil camels are linked up with N. America by finds in different parts of Asia. Such a link exists also for *Triceromeryx*.

When I received the first paper on *Triceromeryx* I was struck by the similarity of the supraorbital horns in this species with a horn from deposits at Tossun-nor in Tsaidam (1937, Pl. VI, figs. 14 and 15). Dr. CRUSAFONT mentions the horn from Tsaidam in his paper (1952 p. 65), but adds that it is a "parco material para obtener conclusiones".

A comparison between the beautiful drawings of the *Triceromeryx* horns in Dr. CRUSAFONT's paper (1952 pl. XI) and photos of the Tsaidam form (the same views of the horns in the two forms are arranged side by side in Pl. I) shows such a close agreement that I have found it necessary to make a revision of the "Giraffidae sp." from Tsaidam. In my paper of 1937 the horn was associated with a calcaneus, an astragalus, a fragment of a cubonavicular, and a partial metacarpus under this designation. I still hold that the limb bones belong to a giraffe (l.c. textfig. 85; calcanei of various artiodactyls are compared with the Tsaidam specimen and its agreement with the giraffids is obvious; Pl. VII, fig. 1, 1937, may also be compared with Pl. IX, fig. 2, 1926). These skeletal bones found in the same area as the horn made the reference of this latter to a giraffid seem inevitable.

I am now convinced that the association of the horn and the limb bones was a provisorium that cannot be kept up. The discovery of *Triceromeryx* makes it possible to prove beyond doubt that the Tsaidam horn belongs

to a dromomerycid, evidently closely related to *Triceromeryx*, which adds a new, remarkable species to the faunal list from the Tossun-nor area.

The horn from Tsaidam was in 1937 designated as the left horn but described as if it belonged to the right side, which must, in fact, be the correct interpretation.

The horns have the following characters in common. They taper upwards in the same way and end in a similar slight swelling with deep impressions of blood vessels. On one side, probably the interior one, a few, wide, anastomizing furrows are seen; the arrangement of these structures is very similar in the two horns. One side, evidently the anterior one, is concave and shows small excrescences of bone, best developed in *T. pachecoi*. The posterior side is straight and carries a close striation of comparatively fine parallel furrows as does also the lateral side. The cross-section of the Tsaidam horn is elongate and »abgerundet dreieckig» at the base (1937, p. 56), whereas the published cross-sections of the Spanish horns are almost circular.

The agreement is too perfect to be a mere coincidence — especially as the same arrangement of the structures mentioned is found in another horn from the Spanish locality (CRUSAFONT 1953, Pl. X: The same terminal swelling, the same difference between the furrows for blood vessels on the sides etc.). In a third horn the knob at the tip is evidently missing. In conclusion it may be said that the Tsaidam horn would, without the slightest hesitation, have been referred to *T. pachecoi*, had it been found in the Iberian peninsula.

The localities lie widely apart and it is therefore unlikely that the Tsaidam form really belongs to *T. pachecoi*. It is therefore here made the type of a new species:

Genus *Triceromeryx* VILLALTA, CRUSAFONT and LAVOCAT.

Triceromeryx tsaidamensis nov. sp.

Type: A left supraorbital horn.

Age: Probably Late Miocen.¹

Locality: The badlands N. W. of Tossun-nor (Tsaidam).

Diagnosis: Supraorbital horns as in *T. pachecoi* but more compressed from the sides, and less rugose.

The classification of the Ruminantia is far from settled, though there is a fairly good agreement between most authors on many points (see SIMPSON 1945 pp. 265—272). In my opinion any attempt to classify North American and Old World forms together is apt to bring about confusion. Only an example: It is true that the horns in *Antilocapra* have sheaths, but these include hair and have not acquired a perpetual growth. Even if *Antilo-*

¹ A definite determination of the age of this and other deposits has to be postponed until the rich material of maps and notes on the geology has been worked up.

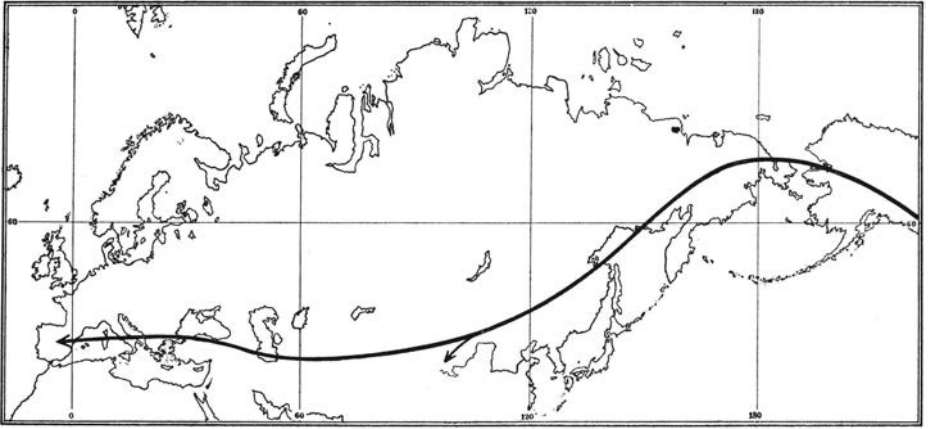


Fig. 1.

capra could be admitted into the Bovoidea, an admittance of *Merycodus* must seem very strange. Would it not be better to keep New World and Old World ruminants apart, at least as a practical measure? The two groups are so widely different that we cannot expect any New World form to be a link in an Old World line of evolution or vice versa. The migrants from one continent to the other are easily recognized. North America has a fairly great number of living ruminants of Old World origin — these have, in fact, supplanted the endemic ruminants in this continent, with a single exception. A migration in the opposite direction into areas occupied by a great variety of large ruminants well adapted to the conditions offered by the country was less successful. Till now only *Triceromeryx* is known to have come across, and it succeeded in reaching the extreme west of the Eurasiatic continent. A find from Central Asia gives us a hint of its way thither (fig. 1).

The main purpose of this paper is to demonstrate the presence in Tsaidam of a ruminant that is closely related to *Triceromeryx pachecoi* and geographically forms a link between the Spanish find and the North American forms, which show the greatest resemblance to *Triceromeryx*. It seems to me that there is no doubt as to the reference of the horn from Tsaidam to the Spanish genus. Our present knowledge of the distribution of the cranio-cerotids and the relative age of its known members may, however, allow of some other zoogeographic interpretation than that suggested here, but without resorting to convergent evolution to solve the problem.

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Plate I

Figs. 1—3. *Triceromeryx pachecoi* VILLALTA, CRUSAFONT and LAVOCAT. Supraorbital horn. Internal, ? anterior, and external views.

Figs. 4—6. *Triceromeryx tsaidamensis* nov. sp. Same views.

All figs. $\frac{2}{3}$ nat. size.

