

sheep." With the metal period there appear hornless sheep; but whether this was a new race which was imported with the metals can not be determined with absolute certainty. The long-tailed sheep living to-day in the Anau district is not always horned. At all events, the breeding of sheep began very early and increased as long as we were able to follow it.

Connected with this breeding is the appearance of the shepherd-dog (*Canis familiaris matris optimæ*) during this second culture. It was possibly derived from the small Russian wild dog (*Canis poutiatini* of Studer) or from the dingo. In Europe this form of dog occurs first in the bronze age, but very much later than in Anau.

Thus the animal industry of Anau shows, in the second half of the first culture period, a very considerable breeding of cattle and horses; a less-developed, because just beginning, breeding of sheep; and a still less-developed breeding of swine.

The second culture of the North Kurgan, however, shows a shifting of the conditions. New domesticated races appear suddenly, pointing to external communications, either as a result of hostile immigration or of friendly exchange. There is still represented the ox—which through bad nourishment has diminished in size—as well as the horse, the sheep, and the swine, but now there appear among the herds of the Anau-li the high-legged, long-necked camel, the hornless sheep, and the short-horned goat.

During this period the breeding of sheep and swine has increased while that of the horses is unchanged, and that of the cattle has diminished. This is probably due to the fact that the newly imported camel, under changed climatic conditions, was better adapted to, and performed more contentedly, the duties of milk and work animal. The animal industry of the region of Anau at this period seems to approach more closely to the character of that of modern Turkestan, especially when one considers that in the course of centuries, under the influence of the changed religious observances, the breeding of swine and cattle has been still more suppressed.

The cattle industry of the æneolithic or first culture of Anau was, however, different from that of to-day. The climate, too, was probably not as unfavorable as it now is. The animal industry of the second culture or first copper age approaches modern conditions and the races of domestic animals have very likely remained the same. The paralleling of these living races with the subfossil remains and their exact comparison can not be undertaken in this memoir because of the lack of material, but it is to be hoped that it will be made possible through a continuation of the study of bone remains from Turkestan.

Mucke\* in his theory of domestication contends that domestication could not have been accomplished by a people in the hunting stage, but only by a primitive people who did not make use of weapons against the animals. This would agree quite well with the conditions at Anau. If, however, we do not consider the Anau-li unqualifiedly as the direct domesticators and breeders of the domestic animals, this is because, according to Mucke, the essential basis of breeding is the possession

\*Mucke, J. R., *Urgeschichte d. Ackerbaues u. d. Viehzucht*, p. 256. Greifswald, 1898.