

- ¹ Zahner, P. J., *Water Deficits and Plant Growth* (edit. by Kozlowski, T. T.), 2, 191 (Academic Press, London and New York, 1968).
- ² Stewart, C. M., *Nature*, 214, 138 (1967).
- ³ Wilson, C. C., Boggess, W. R., and Kramer, P. J., *Amer. J. Bot.*, 40, 97 (1953).
- ⁴ Kozlowski, T. T., *J. Hort. Sci.*, 43, 1 (1968).
- ⁵ Kozlowski, T. T., *Water Deficits and Plant Growth* (edit. by Kozlowski, T. T.), 1, 1 (Academic Press, London and New York, 1968).
- ⁶ Kramer, P. J., *Plant and Soil Water Relationships: A Modern Synthesis* (McGraw-Hill Book Company, New York, 1969).

Ancient Scythian Wool from the Crimea

THE origin of fine-woolled sheep has long interested historians and wool biologists. A fine-woolled type was recognized in antiquity, and one of us¹ showed that 2,000 yr old cloth from Palestine, although seemingly made of fine wool to the naked eye, contained a proportion of medium fibres revealed when

to the fifth century BC. It is interesting that it is associated with the Black Sea area, because the legend of the golden fleece, which has been taken to refer to fine wool, is of similar date and is associated with the same area. The only previous Scythian sample examined, from Parzirik in central Asia, was a hairy type with a fleece not unlike that of the sheep in the same area today².

M. L. RYDER
J. W. HEDGES

ARC Animal Breeding Research Organisation,
Edinburgh EH9 3JQ

Received December 14, 1972.

- ¹ Ryder, M. L., *Nature*, 204, 555 (1964).
- ² Ryder, M. L., *The Domestication and Exploitation of Plants and Animals* (edit. by Ucko, P. J., and Dimplebey, G. W.) (Duckworth, London, 1969).
- ³ Ryder, M. L., *Nature*, 240, 355 (1972).
- ⁴ Ryder, M. L., and Stephenson, S. K., *Wool Growth* (Academic Press, London and New York, 1968).
- ⁵ Ryder, M. L., *Aust. J. Sci.*, 24, 246 (1961).

Table 1 Fibre Diameter Measurements (μm)

	System	Diameter range*	Mode	Mean	Distribution	Coeff. of variation (%)	Standard deviation	Percentage medullated	Fleece type
Cloth	(a)	10-25, 29, 31, 35	16	16.5	Skew fine	24.2	4.0	0	Fine
	(b)	9-26	12	14.3	Skew fine	23.0	3.3	0	Fine
Yarn		8-24, 34, 44, 45	13	15.4	Skew fine	38.0	5.9	2	Fine

* Fibres outside the principal range are listed separately.

examined under the microscope. This predominant type at that time formed a generalized fleece in an intermediate evolutionary position between a more primitive hairy type and several modern more highly evolved fleece types, notably the true fine wool, which was already in existence in small numbers at that time^{1,2}.

The chief feature of this generalized type is a skewed distribution of fibre diameter, in which the bulk of the fibres is fine. It was in existence in the Danish Bronze Age³ and in ancient Egypt⁴. The true fine wool has a symmetrical diameter distribution, with a mode and mean about 20 μm , and there are suggestions that this went back to the fourth century BC in Palestine².

The material comprised two pieces of cloth, one having only one yarn, in the Ashmolean Museum, Oxford, and came from a Scythian tomb (Tumulus I) in the Crimea near the Greek city of Nymphaeum. Its date is fifth century BC.

Whole-mount microscopical preparations were made and diameter measurements carried out on 100 fibres from each yarn using the International Standards Organization method 181 (ref. 4).

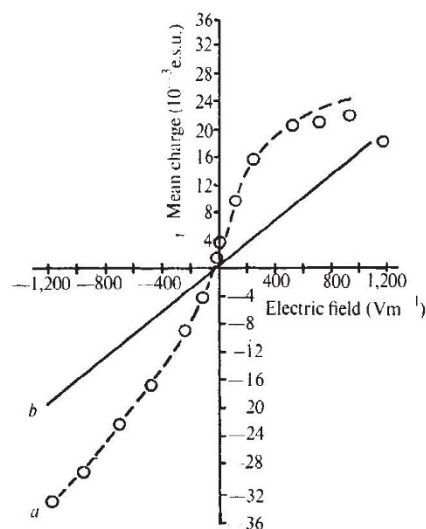
The wool fibres had the yellow-brown discoloration common in archaeological specimens with no evidence of the granules associated with natural pigmentation.

Fibre diameter measurements are shown in Table 1. The fleeces are clearly of fine type, although the diameters still have a skewed-to-fine distribution. The means and modes have an exceptionally low magnitude even for fine fleeces. These values are lower than those in the Egyptian wool⁴ and were found previously in Danish Bronze Age wool³ and some Roman samples². The means and modes are comparable with the undercoat of the wild sheep⁵. In spite of the fineness, a few of the fibres had a medulla. This has been noted previously in archaeological specimens, notably in the Egyptian wool⁴.

These samples firmly establish the fine wool as going back

Erratum

OWING to an administrative error, Fig. 2 was omitted from the article "Polarization Charging Effect and Thundercloud Electrification" by Zev Levin and W. D. Scott (*Nature*, 240, 232; 1972).



In paragraph 4, line 4 and paragraph 5, line 1 therefore Fig. 1 should read Fig. 2. In paragraph 2, line 5 should include (Fig. 1) after 5,000 V m^{-1} .