advanced on the way to civilization as above defined. I find it tempting to profit by the unique advantage of the English language and call such settlements, more complex than villages yet not deserving the title of ' city ', ' towns '. V. G. CHILDE.

[We welcome Professor Childe's criticisms and will try to be more careful in our choice of words. He himself had laid the foundations on which these subtle distinctions rest, and he has every right to demand that we should use the correct terminology for them.—EDITOR.]

COMMENT ON ' EARLY GOATS ' (PLATE VIII, B)

The short article on ' Early Goats ' in the June 1956 issue of ANTIQUITY raises two major problems which, in my opinion, merit further discussion.

1. Professor F. E. Zeuner has stated (*Palestine Exploration Quarterly*, April 1955), and you quote him correctly, that the earliest, straight-horned domestic goats of the Neolithic period were replaced by goats with spiral or screw-horns in the Chalcolithic and Bronze periods of the Eastern Mediterranean. When you continue, however, ' Attention was first drawn to *them* (italics mine) in ANTIQUITY (XI, 1937, pp. 226–8) by Prof. Amschler . . .', you are presuming that the screw-horned goats mentioned by Prof. Zeuner were necessarily of the Girgentana-type discussed and figured by Prof. Amschler. The remainder of the article on ' Early Goats ', which is limited to further discussion of goats with the Girgentana-type horns, verifies this conclusion.

I cannot find any indication in Prof. Zeuner's article, however, to support a conclusion that he was referring to such Girgentana-type screw-horns. It is my opinion that Prof. Zeuner is merely stating that the earliest known goat from Jericho had horns of the scimitar or straight type, as in the wild *Capra aegagrus* of South-Western Asia, and that subsequently domestic goats are found in which the horns are *not* straight, but are twisted, and thus similar to those of most domestic goats.

The change from the straight horn-core with an almond-shaped cross-section (Zeuner, *op. cit.*) to that of a horn-core with an incipient twist and a flattened inner surface (PALTE VIII, B) had already happened before the Chalcolithic, as such advanced types were present in the village-farming community of Jarmo in the foothills of eastern Iraq, approximately 6700 years ago. Wild-type horn-cores are also found at Jarmo, side by side with the ' domestic ' type, so there may have been at that time both straight and twisted horns in the domestic flocks, or the wild-type cores may represent true wild goats, which are still present in the adjacent hills.

If one followed the argument expressed in the article on ' Early Goats ', one would have to assume that *all* domestic goats subsequent to the early Metal Ages were necessarily derived from those with Girgentana-horns; I do not believe that the evidence supports such a view, or that Prof. Amschler or Prof. Zeuner intended their remarks to be so interpreted.

The difficulty involved in this first problem seems to be a misunderstanding of the meaning of ' spiral or screw-horned ', as used by Prof. Zeuner merely to mean not-straight. The Girgentana-type horn would seem to be a special genetic variant of the general spiral-type, but its sporadic appearance at different times and places does not prove the continuity of any specific breed through all the time involved, nor indicate a blood relationship of all the individuals involved. I have observed this Girgentana-type horn, as a rare feature, in flocks of domestic goats in the mountains of Iraqi Kurdistan; in such instances, the goat was merely one of a flock, the remainder of which had the more typical screw-horns. Presumably, the Girgentana-type horn is due to a particular genetic combination which

can occur by chance in any flock carrying the potential genes; if a goat bearing such horns is selected for propagating this character, as has probably happened several times in the past, then a population could be developed which bore only the Girgentana-type horns. As long as such a population was maintained, with no out-crossing, it could be referred to as a ' breed ', but it does not represent a distinct species.

2. The use of specific names as applied to domestic animals is the second problem to which I wish to allude; it is brought to focus by the series of articles, on goats with Girgentana-type horns, which has appeared in ANTIQUITY at different times from 1937 to 1956. Linnaeus, in his Tenth Edition of the ' Systema Naturae ' (1758), designated the domestic goat as *Capra hircus*. Since, according to the International Rules of Zoological Nomenclature, names in this publication have priority over any subsequent names, all domestic goats, so long as they form, actually or potentially, an interbreeding population, can bear no name but *Capra hircus*. To call a goat *Capra girgentana*, merely because the shape of its horns varies from that of other domestic goats, is no more logical than would be the separation of people into species by differences in shapes of their big toes.

Each domestic animal has one specific name, and one specific name only. It is true that there are basic difficulties in naming domestic animals and their wild relatives as we investigate these animals at the time of origin of domestication, but this problem need not confuse the basic issues considered here.

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FORE AND AFT RIGGING IN THE ROMAN EMPIRE

A recent number of *The Mariner's Mirror* (Vol. 42, No. 3, Aug. 1956) contains two notes, one critical and one favourable, on Professor Lionel Casson's recent article in the February number of the same journal (referred to in ANTIQUITY, No. 119) claiming that the Greeks and Romans of the 2nd to 4th centuries A.D. used sprit sails and lateen sails.

On p. 238 in ' Fore and Aft Sails in the Ancient World ', L. Guilleux la Röerie, though he does not deny the possibility of fore and aft rigs in the ancient world, is nevertheless of the opinion that Casson's instances were not convincing. He considered that the alleged sprits on Casson's Plate I Nos. 1 and 3 were only symmetrical braces, that Plate I Fig. 2 was too vague to be useful, that he could not see the diagonal spar on Plate II Fig. 4 and that on Plate II Fig. 5 the ordinary motive of a man pulling at a brace has evolved into a man holding a spar.

On p. 239 in ' The Earliest Lateen Sail ', Richard Lebaron Bowen Junior, who has had great personal experience of handling lateen-rigged boats in the Arabian Gulf, expresses complete confidence in Casson's examples of sprit sails and only criticizes the evidence for the lateen sail so far as to point out that Casson's photograph was taken from a copy, whereas a photograph taken directly from the relief in Athens shows that this sail would be more accurately described as a short-luff lugsail (as indeed are practically all the so-called lateen sails of Arab dhows now in the Arabian Gulf). Cf. H. H. Frese, *The Mariner's Mirror* 42. No. 2, 1956, p. 101, for other varieties of dipping lugs.

R. W. HUTCHINSON,

DIGGING-STICKS AND THEIR USE IN JAVA

The following extract from a letter written in 1939 by the late Professor R. G. Collingwood, soon after his return from Java, has been sent us by Mr Angus Graham, to whom we tender our thanks:

' I have seen digging-sticks in use, among tribes who have no ploughs or mattocks