

ilar grain and consistency. The action of the wind upon them forms almost identical features, some by erosion and others by heaping up the material swept from elsewhere. In view of these facts it seems at first glance that one term for the eroded ridges and another for the built features would suffice. We might then have silt *zastrugi* and snow *zastrugi* and also sand dunes and snow dunes. Out of 28 geologists and explorers to whom I have referred the question seven adopted this position, while two made no choice.

Of the fourteen who believe that both *zastruga* (or less correctly *sastruga*) and *yardang* are needed terms and should be retained, some are influenced by the fact that snow differs from silt in being subject to melting. Others, including three Arctic explorers and two eminent geomorphologists, employ the word *zastrugi* to denote the various minor irregularities of the snow surface whether due to erosion, deposition or differential melting.

The *yardang* is apparently a definite type of land form due exclusively to the abrasive action of wind on suitable material. If any one chooses to speak of *snow yardangs* he will be perfectly understood, as he will be also in speaking of *snow dunes*, *snowslides* and *snow ripples*. The term *zastrugi*, however, has never been thus limited, and it is evidently in common use by Arctic explorers to describe features some of which are wind carved, others wind built and some not wind made at all. From these facts it may be concluded that both terms probably have their uses and will be retained, but of the two *yardang* is the more definitely limited in meaning and hence more satisfactory for the purposes of the careful geomorphologist. *Zastruga* is likely to be used chiefly by Arctic explorers and geographers not primarily concerned with processes of land sculpture.

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WHAT IS CHITINE?

THE entomologists and the chemists have come to a curious dilemma with reference to this very common word. The entomologists universally give it a physical interpretation, using it to refer to the characteristic system of organic substances which make up the insect exoskeleton, while the chemists as consistently use it of a single chemical compound, which they can isolate by the proper chemical processes from this complex. Many people have assumed that the difference was trivial, on the ground that the chemists' "chitin" was the principal substance of the entomologists' "chitin." In fact, Campbell's recent study¹

shows plainly that the chemists' chitin is in fact a secondary constituent of the insect skeleton, never constituting more than half of its substance, and occasionally (as in egg-shells and tracheal lining) wholly wanting.

On turning to the original proposal of the term,² we find that the author undoubtedly was the originator of the misconception that his chitine was the principal substance, on account of the somewhat loose way in which he presents his analysis; but that he obviously had specially in mind the substance that the chemists now call chitin (or rather chitosan), and that he postponed for a later study, which I believe never was carried out, the study of the larger amount of substance which he calls "the part of the precipitate insoluble in alcohol" on page 33, and which obviously includes the substance or substances which give the insect exoskeleton its hardness, its color and the major half of its substance.

Shall entomologists then continue to call "chitine" the substances that make the exoskeleton of insects, as they have been doing for nearly a century, since Newport, or shall they grant to the chemists a word which was originally proposed by a chemist and has had an even longer period of use in chemistry, though there is an older name (*fungine*) for the same substance? I suspect that we shall probably go on as we have been doing; the entomologists will use chitine (like bone) for a physical system of substances which is formed into structures of interest to them; while the chemists will continue to use it of the soft transparent "filler" of the insect skeleton which is on the whole of very little interest to the entomologist, but is a chemical substance of known composition.

There seems need for further research on both sides; the composition of the substances which give the insect skeleton its hardness and its characteristic tint has never been made out—a thing which only the chemists can do; and there is need for the entomologist in turn to find what place in the insect economy is taken by this other substance the chemist calls chitin, and which so commonly makes up a substantial proportion of the skeleton.

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TOPOGRAPHIC CONTROL OF CLOUD DISTRIBUTION

IN Giles and Montgomery Counties, Virginia, and the adjacent portion of West Virginia, there are three minor physiographic provinces, the state line separating the northwestern from the central. The Cumberland plateau, the northwestern province, is made up of round and oblong hills which rise to

¹ *Annals Ent. Soc. Am.*, 22: 401-426, 1929.

² Odier, *Mém. Soc. Hist. Nat. Paris*, 1: 29-43, 1823.