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 study[1] 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.

heights of 1,000 feet above drainage. The Central or Alleghany province is composed of linear ridges separated by valleys of varying width, trending northeast-southwest, with seven more or less definite parallel ridges in a distance of 14 miles rising to heights of 1,000 to 2,000 feet above drainage. The southeastern, or Great Valley province, is a broad valley consisting of a dissected peneplain which lies at an elevation of about 2,100 feet.

It sometimes happens in this region that the alignment of clouds with mountain ridges is so conspicuous that there can be little question but that the distribution of clouds is determined by the topography. This is likely to be conspicuous when there are continuous thin clouds covering the Cumberland plateau and moving to the southeastward. As the cloud mass moves over the Alleghany province there is a gradual alignment of clouds in the northeast-southwest direction paralleling the mountain ridges, separated by narrow cloudless areas, and the perfection of this arrangement increases with progress southeastward across the ridges. This parallelism is maintained for several miles over the Great Valley and gradually becomes less definite.

R. J. HOLDEN

TWIN SEEDLINGS IN ANGIOSPERMS

IN SCIENCE for May 16, 1930, one of the items of the Supplement page xiv has to do with the possibility of two plants being produced from a single seed. "Mrs. Tema Shults Clare, a teaching fellow at the University of Southern California, has obtained in two instances pairs of twin seedlings sprouting from Torrey pine seeds, and one pair of similar twins from the seed of a piñon pine." To this report is added the following statement: "This habit of twinning from single seeds is peculiar to the gymnosperms. The higher seed plants, the producers of showy flowers, apparently do not have this possibility."

In SCIENCE for August 23, 1929, R. H. Woodworth reported the production of two embryos from one seed of *Alnus rugosa,* a species of the Betulaceae which is a family of the Angiospermae. From a sowing of 150 seeds about 50 per cent. germinated and six of these produced twin seedlings. The pairs have developed quite normally into young plants. This phenomenon is considered at length in a paper entitled "Parthenogenesis and Polyembryony in *Alnus rugosa,*" which appeared in the *Botanical Gazette* for June, 1930.

It is also well known that the citrus fruits, particularly the grapefruit, produce seeds which frequently give rise to more than one seedling.

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MINERAL RESOURCES OF GREECE

ONE usually thinks of Greece as the home of decaying monuments to immortal thinkers and writers. Few of us realize that Greece is a wealthy country. The ancient Greeks did considerable mining of copper, silver and tin, but they did not begin to touch the wealth of other minerals which lay beneath the soil. The development of natural resources has remained inactive for ages.

The Germans were pioneers in extracting some of Greece's mineral wealth and are still active in some localities. The British have long been quarrying the valuable and extensive marble deposits, but on the whole a vast and virgin area remains to be worked.

The more abundant ores found in Greece are those of iron, lead, sulfur and magnesium. The yearly production of these ores averages 322,000 tons. Iron ore mined amounts to 88,000 tons containing 42–62 per cent. iron. Lead is mined to the extent of 76,000 tons. This ore is rich in silver. Magnesite occurs throughout Macedonia and contains 95 per cent. magnesium carbonate. Other ores extracted in lesser amounts are those of zinc, nickel, chromium, manganese, aluminum, copper and antimony. The total amount mined approaches 30,000 tons yearly.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A PRACTICAL METHOD OF DETERMINING THE FALL IN POTENTIAL IN A MICRO-ELECTROPHORESIS CELL[1]

A PRACTICAL method of determining the fall in potential in a micro-electrophoresis cell is described, whereby it is possible to determine the fall in potential at any stage of an experiment without any loss of time.

[1] From the Laboratory of Hygiene, Department of Pensions and National Health, Ottawa, Canada.

The method is a so-called null method and in principle consists of balancing two unknown circuits using a precision voltmeter to register the voltage in one circuit necessary to balance the other, as indicated by a sensitive galvanometer. A certain definite assembly of apparatus was found to be most satisfactory. Fig. 1 indicates the apparatus used together with the connections, and is self-explanatory. The Central Scientific (Weston) galvanometer is placed in the circuit for preliminary balancing.