DISCUSSION AND COMMUNICATIONS.

MEANING OF THE TERM "ROCHES MOUTONNÉES."

A recent textbook of geology concludes its description of glacially rounded knobs of rock by saying, "Such rock surfaces when seen from above have a fanciful resemblance to a flock of crouching sheep, on which account the French have called them *roches moutonnées.*" This statement has abundant support in older geological books. J. D. Dana, in the final edition of his *Manual of Geology* (1895, p. 250), says:

"The ledges underneath [the glacier], or especially their harder portions, are often made, by glacial abrasion, into rounded, grooved knolls, called *sheep-backs* (*roches moutonnées*) in allusion to their forms." Bonney, in his *Ice Work Present and Past* (1896, p. 10), describes similar knolls and says they are "like the backs of sheep. From this resemblance such masses are called *roches moutonnées.*" Lyell (*Principles of Geology,* 12th Ed., 1875, Vol. 1, p. 372) describes "dome-shaped masses of smoothed rock" fashioned beneath a glacier, and says they are "called in Switzerland *roches moutonnées,* for they are compared to the backs of sheep which are lying down."

I owe to Professor E. B. Bailey, of Glasgow University, the information that the term *roches moutonnées* was first used in 1796 by de Saussure in his *Voyages dans les Alpes* (Vol. IV, §1061).[1] The essential part of this original definition, translated freely, is as follows: ". . . behind the village of *Juviana* or *Envionne* there are some rocks which have a form that I call *moutonnée* . . . .The hills that I designate by this term consist of an assemblage of rounded tops, covered sometimes with woods but more often with grass, or at the most with brush. These contiguous and repeated curves, taken as a whole, give the effect of a thick fleece, or of those wigs which also are called *moutonnées.*"

It is clear that de Saussure applied his term to a *group* of the glacially rounded knolls. Such a group, seen from some distance as a unit, suggested to him a curly fleece and also one of the wavy wigs (*perruques moutonnées*) that were fashionable in his day. There was no thought in his mind that each of the knolls resembled a sheep's back or that several of the features together were like a flock of sheep. This wholly different conception of the term, now held very generally by geologists, probably originated much later, after de Saussure's definition had been forgotten. The newer meaning may be defended as having been established by long usage, and also on the ground that it increases the usefulness

[1] A reference to this original definition is given by E. J. Garwood in Quart. Jour. Geol. Soc., Vol. 88, pt. 3, pp. xcvi-xcvii, 1932.

of the term. If de Saussure's definition were observed, we could apply the term to glacially rounded knolls only where they occur in groups; and yet in every glaciated region many of these hills occur singly.

There is no suggestion in de Saussure's description of *roches moutonnées* that he suspected their glacial origin. It is not to be expected that anyone would have recognized the significance of these features fifty years before Louis Agassiz published the results of his epoch-making studies. However, it did not escape de Saussure's keen observation that the *roches moutonnées* of the Alps are best developed on rocks with massive structure. He wrote that they "are almost always of primitive rocks, or at least of steatite; for I have never seen any hills of limestone or slate that assume this appearance."

The descriptive adjective *moutonné* as employed by de Saussure is common in French literature. Thus the fleecy cirrus clouds that give the effect known as "mackerel sky" are called by some French writers *nuages moutonnés.*

CHESTER R. LONGWELL.

YALE UNIVERSITY,
NEW HAVEN, CONN.

SCIENTIFIC INTELLIGENCE.

CHEMISTRY.

Bibliography of Bibliographies on Chemistry and Chemical Technology. 2d Supplement, 1929-1931. Compiled by Clarence J. West and D. D. Berolzheimer. Bulletin Nat. Research Council No. 86. Pp. 150, Washington, D. C., 1932, $1.50.—This supplement brings the literature on bibliographies regarding chemistry and chemical technology through 1931. In connection with the previous publications on the subject, it is a useful directory giving the addresses—so to speak—of bibliographies in the various fields which concern chemists, beginning with 1900. H. W. FOOTE.

CHEMISTRY AND PHYSICS.

Atom and Cosmos: The World of Modern Physics; by HANS REICHENBACH, translated by E. S. ALLEN. Pp. 300, 21 figs. New York, 1933 (Macmillan Co., $2.00).—In this series of lectures, based on broadcasts sent over the radio from Berlin during the winter of 1929-30, the author attempts to give the non-specialist some understanding of modern advances in physics. His training