will already begin to see that minerals cannot be distinguished by their colors.

Before leaving these two minerals their crystals should be compared. It will be found that calcite crystals will split along smooth surfaces running in definite directions. These crystals, are, therefore, said to possess cleavage, and the surfaces along which they split are called planes of cleavage. Their edges are indicated by lines running across the faces of the crystals. No such planes can be found in the crystals of quartz, although lines of fracture, where the crystals have begun to break or crack, may sometimes be mistaken for the edges of cleavage planes. Quartz crystals are devoid of true cleavage. They are terminated by six-sided pyramids, *i. e.*, they have six triangular faces on the end. Calcite crystals vary greatly in form, and some of them look remarkably like crystals of quartz. But their softness, as well as their cleavage and effervescence, when treated with acid, at once distinguish them from quartz.

It will be interesting and instructive for the pupils to prepare crystals of some substances which are soluble in water. For instance, let them, at home, make strong solutions of common salt and alum; then hang a thread or two in each and set them away where they will be undisturbed. In a day or two, if the crystals which form are very small, the threads may be hung in another strong solution that the crystals may grow. Beautiful crystals can be obtained in this way. The pupils may be led to see that if they could dissolve the massive (uncrystallized) pieces of quartz and limestone they might obtain quartz and calcite crystals. They will also infer that the crystallized forms of these minerals must have been dissolved in some way before they crystallized.

Do not hurry these first lessons. Give the pupils time to do their own observing and reasoning, even though it take the allotted time for two months to get through with quartz and calcite. If time can be found the pupils should write a careful account of each lesson. These notes should be examined by the teacher and afterwards corrected by the pupils.

J. BRITTAIN.

We commend to teachers the thoughtful consideration of the following by H. L. Clapp, Boston, in the *Journal of Education*: "In nature study we find the best material for language work and drawing. Free flow and continuity of thought never came so easily with other material. There never was so much disposition to use the pencil freely outside the school as well as inside. Power to observe accurately, reason independently, and express concisely by the voice, the pen and the pencil, has reached a high stage of development. Nature study seems to have clarified the children's thoughts, developed their self-reliance, and shown them the real correlation of studies better than any, perhaps I might say all, thing else which they have studied."

For the REVIEW.]

Suggestions on Teaching Geometry.

The proper teaching of geometry is a matter of vast importance, for every boy and girl should get the fullest benefit of the mental training to be obtained from the study of that subject. A good teacher is by no means bound down (Provincial Exam. notwithstanding) to any particular text-book, and there is no reason why he should allow himself to be hampered by a slavish adherence to either Hamblin Smith or Hall and Stevens—to mention only those prescribed in Nova Scotia.

In his report for January, 1893, an agent of the Massachusetts School Board remarks two methods among teachers of geometry. The first is the study of the syllabus from a text-book with full demonstrations, the "obvious lack of mental training being made up for by so-called 'original' deductions from the syllabus." The other is to pursue the syllabus by the "original" method. He finds that the "original" method is the best when the teacher has ability enough to carry it out, and deplores the fact that many of the usual deductions from the syllabus are so valueless, and thinks they would be better replaced by propositions that would be useful afterwards. A syllabus text-book is, in my opinion, very necessary, but it should be of the simplest kind possible and give the pupil every opportunity under the guidance of his teacher, to make use of his acquired knowledge, and learn to "deduce" for himself.

I would venture to suggest a different way of beginning the subject from that usually adopted. But, first, let me observe that it is better to have the pupil memorize the axioms, etc., only as they become necessary, than to require him to learn them by rote, while as yet, he can see no use for them. Take "angles" as the first subject, and thoroughly discuss their properties before taking up anything else. "An angle is a simple concept incapable of definition properly so-called." Its nature, however, may be described in a "nominal" definition. The idea that it is "the inclination of two straight lines which meet," has to be revised and extended before the pupil finishes the third book. Why not, with Halsted and Wilson,* use the following "nominal" definition: *Two straight lines which go out from a point are said to form an angle.* I have tried both with pupils of all ages and capacities, and found the latter as easily acquired as the former and much more satisfactory. Call the point the vertex and the lines the arms. A line rotating about the point from one arm to the

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* Elements of Geometry, Halsted—Wiley & Sons, New York. Elementary Geometry, Books I. IV., Wilson. McMillan & Co. London.