

which partly accounts for the first, that there is nowhere in this country any place where even an idea of what material there is, can be got. In short, we do not have good material, because we do not know what good material is.

Supposing, however, that all schools were fully equipped in that line, there arises the other issue, have we teachers who could properly use the material, and in a scientific method produce in a pupil's mind that happy result so much talked of, so seldom seen? To this there are two answers, — yes and no. The first applies to teachers who would instruct the elementary classes.

If the average normal-school graduate had been properly trained by a broad-minded instructor in the use of material, and made thoroughly acquainted with the general facts of geography and its brother-studies, botany, zoology, ethnology, etc., such graduate would be, in the primary and intermediate schools, fully competent to do the work. But in higher work, where scientific deduction should be employed, where a wide and deep knowledge on the part of the instructor is demanded, the average normal graduates could not do the work. They are not mature enough, they do not know enough. I mean what I say, when I say they do not know enough.

They are not to blame. Geography needs a fund of general information and of special information as wide as a church-door and as deep as a well. No teacher whose specialty is not geography ever acquires it, and we have almost none who are devoted to this one subject. The class-room system forbids.

This upper stage of the work needs the mature strength of college graduates, and of college graduates devoted to geography. Of such there are almost none.

In fact, I know of a vigorous attempt recently made to find one, which ended in failure. Germany alone provides her schools with such men. There one must go to know the whole subject.

These two points, then, being stated, there appears to me but one way out. The best mode of reforming the lower-grade teaching is available. Material should be brought from the centres of geographical interest abroad, and the school public made aware of the resources to be had. Then there might be an advance there.

As to teachers for the upper grade of geography, until our colleges take a higher stand in regard to requirements in the subject, and provide professors who can teach the subject so that their students will

have a real, living interest in the matter when they leave college, — until then we must wait, content with the few men who, of their own accord, work up the subject from a professional stand-point, and in their own circle of influence do really teach geography.

C. H. LEETE.

New York, May 14.

Queries.

4. TEST FOR OLEOMARGARINE. — Please give a simple test for distinguishing butter from oleomargarine. — P.

[There is no simple test for distinguishing butter from oleomargarine, — a test which at the same time is simple and accurate, and which settles the question beyond doubt. A great many tests have been proposed from time to time, but they either require special skill and apparatus for their execution, or they are of very little value, failing to accomplish what they promise. The following test will perhaps be found of some use: a cotton wick is saturated with melted fat from the butter to be tested; the wick is lighted, allowed to burn for a short time, and then blown out. If the sample is oleomargarine or adulterated butter, an offensive odor, as of an extinguished tallow candle, will be perceived. It is to be noted, however, that pure butter which has stood for a long time will give the same smell. Another test is the following, devised by J. Horsley: a little of the clear, melted fat is poured into a small test-tube; the fat is dissolved in common sulphuric ether, and about thirty drops of spirit of wine are then added; if natural butter, a white precipitate will be formed; if artificial butter, the solution will remain clear. While these tests may sometimes prove efficient, they will often leave the point unsettled. Other tests proposed for discrimination between oleomargarine and natural butter may be of more value, but, calling for special apparatus and solvents, they can hardly be called practical or simple. Chemical analysis of suspected samples will decide the question beyond dispute: outside of the chemical laboratory we have as yet no practical means of fully ascertaining whether a sample of butter is natural or artificial. — ED.]

5. A SQUARE PUZZLE. — Having a rectangle nine by sixteen, is it possible by one cut to make two figures which joined shall make a square twelve by twelve? — Z.

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