getting the amount held within the interstices of the media.

In those filters in which the mechanism or media is reversed for cleansing, the organic matter upon which the microbes are feeding and multiplying, and which has become attached to the walls of the spaces of the filtering media, are not removed, any more than the greenish scum is removed from the stones in a rapidly flowing brook: on the contrary, so tenacious is this material, that it forms in strings and streamers pointing with the current.

As is well known, commencing at the set bowl in a dwelling-house, a deposit forms upon the sides of the waste-pipe, continues downward, adhering to the sides of the trap and continuing to the drain-pipe and sewer, till it reaches the point of delivery. This deposit is, of course, composed of the wastes which have been thrown into the bowl, and which is fully charged with organisms whose function is to destroy and assist in nature's retrograde metamorphosis. The strongest flushing of this pipe does not remove the slime from its sides: how, then, can a retarded pressure of water wash away the organic matter adhering to the sides of our meshes of felt and our granules of quartz and charcoal?

The number of microbes in a given sample of water serving to render it harmful, has not been actually determined, any more than a specimen can be condemned for the amount of albuminoid, ammonia, or chlorine alone which it contains; still a water containing over a thousand microbes or colonies to the cubic centimetre of water is the highest limit consistent with purity in drinking-water. A water which contains fifty bacteria to the cubic centimetre before filtration will increase to over a thousand in seven days' use, no matter how much care is taken to cleanse the filter short of absolute sterilization.

The point of danger, however, lies in the fact that the two diseases which are communicable by ingestion into the alimentary canal of the excrement from them (typhoid-fever and cholera) are the ones which are liable to find their way into drinking-water from contamination by sewage finding its way into river and well supplies.

I am at present conducting experiments to determine how rapidly the germs of typhoid may increase within filters in the presence of sterilized water and in presence of the bacteria of drinking-water.

GARDNER T. SWARTS.

An American dialect society.

Is it possible to establish such an institution? It is certainly time. Year after year the older districts of the United States and Canada are getting less and less distinguished by those peculiarities in their vernacular which to the student of history and philology are of the utmost interest. Public schools, many newspapers, cheap books, a taste for reading, a notion that 'old-time' ways and dialect are not 'elegant,' and, above all, the more constant communication between different parts of the country, are doing much to tone down the people of the United States to what, from the philologist's point of view, is one dead level. In time the mountaineers of Tennessee and the hill country of the Carolinas, the 'crackers' of Georgia, and the picturesquely talking folk of the Arkansas bottoms and the lower Mississippi, will have lost many of their present peculiarities of speech. Even the New-Englanders, I am told (for I have not lived in America for more than twenty years), are fast abandoning many of those dialectic peculiarities which to a philologist are so suggestive. Even the Virginians, since they have gone into the great world, are no longer so readily 'berayed' by their speech. Now, therefore, is the time to collect vocabularies of these local dialects, with specimens gleaned from printed works illustrating the use of any particular word. Books, almanacs, election-addresses, and a host of similar ephemeral literature, might be gathered and deposited in the national library. Mr. Cable, by his novels, has done much to preserve the quaint Creole Louisianian speech; Mr. Johnston has in the same way done as much for the Georgian dialect; Miss Murfree for the Tennessee mountaineers; Mr. Page for the Virginians; a host of writers, *imprimis* Mr. Lowell, for the New-Englanders; and, not to go over the long roll of writers in American dialects, Mr. Harris has shown us what a wealth of folk-lore and folk-speech there is to be garnered among the southern negroes. But the next generation will have no such easy task as the present one. Even in slow-going England the Folk-lore society and the English dialect society came quite late enough into the field, and found that in a few years more the school boards and the desire to be 'genteel' would have effectually effaced those old-world differences of tongue which even in 1598, when Puttenham was writing his 'Arte of English poesie,' had begun to be blurred. Already many a precious relic of the past has been forever lost, and we can only be thankful that so much has been preserved. In America — I speak, of course, of the old colonial sections — there still linger peculiarities, and even bits of folk-lore, which have vanished out of the districts in the mother-countries from which the immigrants came. Now, therefore, is the time for snatching up what still remains, and I question whether there are not in the United States and in lower Canada quite as many dialects as there are in England. The 'Pennsylvania Dutchman' has even yet peculiarities in speech easily detected by those who know them, and there is scarcely an old state of the Union of which the same could not be said.

R. B.

Streatham, London, Eng., April 30.

Geography-teaching.

The article by Inspector Jolly, on 'Realistic and dramatic methods in teaching geography,' to which you refer in your number of May 12, is without doubt a clear and full statement of the various points of weakness in such work, and of the remedies to be applied.

He urges a greater use of material and a more rational and scientific method. On these two points hangs the whole matter. Every one who has ever taught geography knows that nothing can be done without an abundance of aids in the way of objects, pictures, models, globes, maps, etc.; and every one who has taught in the United States knows that objects, pictures, models, globes, and good maps are there very, very few.

A full assortment is not found in one single school; a good assortment, only in a small number, where men of wide views have had charge. There are two reasons for this condition of things, — one, that few schools take enough interest in the subject to procure what material can easily be had; the other,

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, zoölogy, 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.