A SIMPLE PLANT EXPERIMENT.

BY E. S. GOULD,

Galva, Ill.

The following device for showing the necessity of CO_2 in photosynthesis may be of use to teachers of botany, especially where apparatus is limited.

A bell glass with a rubber stopper is placed on an ordinary pump plate. The tube C of the plate is closed with a cork. In the cylinder inside is placed NaOH or Ca(OH)_2 to absorb the CO_2 . Air is forced through tube A (tube B being open) for a few minutes until the most of the air in the bell glass is devoid of CO_2 . What CO_2 is left in the glass will be absorbed by the NaOH in the cylinder. The air is changed every day so that if there were anything in air beside CO_2 that helped in photosynthesis the plant would be sure to have it. Tube B is kept closed except when it seems necessary to introduce water through it to the plant. Before commencing the experiment the leaves of the plant were found to contain starch, but after continuing it three days all traces of starch disappeared, thus proving that CO_2 is necessary in photosynthesis.

The department editor wishes to raise four questions relative to this experiment:

1. Do the pupils know enough chemistry to enable them to prove that NaOH or Ca(OH)_2 takes CO_2 from the air?

2. Is it true that forcing the air through the liquid in the cylinder by means of tube *a*, and out of the bell jar through tube *b* "for a few minutes" would render "most of the air in the bell jar" devoid of CO_2 ?

3. How does the pupil know that in watering the plant through tube *b* you do not introduce CO_2 sufficient for the plant's uses?

4. Does this prove "that CO_2 is necessary in photosynthesis"?

Do not all the points raised in these questions refer to things that the student must take for granted upon the authority of the teacher? If so, would it be quite as well for the pupil to assume in the beginning that the teacher is correct when he says that CO_2 is necessary to the process of photosynthesis?

O. W. C.

In general, the amorphous graphite is the more impure, and is used for purposes where purity is not a prime requisite. Thus graphitic schist mined in Georgia is ground and put into phosphates used for fertilizer, as a black color is demanded by consumers under the supposition that it means better quality. In Michigan graphitic rock is ground for use in paint. Such materials are of course cheaply prepared and are unfit for the better uses, such as in crucibles, lubricants, and electrical work.

TO THE EDITOR OF SCHOOL SCIENCE AND MATHEMATICS:

Please allow me this brief reply to "Some Comments on a Communication," page 752, Vol. 8, No. 9, 1908.

Though the parallel postulate cannot be verified, yet within the limited space of human experience it holds good practically; if the opposite postulate leads to no beneficial mechanical constructions or fruitful scientific hypotheses, why is it not a justifiable use of language to say it has no *real* or objective meaning?

In regard to the value of geometry as a study "to cultivate the powers of reasoning" when applied to non-geometrical material, a good test has occurred to me. Suppose the expert geometers who voted at the late election should look into their own hearts fearlessly, and question how far their vote was influenced by habits of thought due to their geometrical training; and then publish the result of their self searching in SCHOOL SCIENCE AND MATHEMATICS—that is, frankly state whether they honestly believe their vote would have been different, if, retaining their present economic and social status and mental furnishings otherwise unchanged, they possessed no more geometry than their friend "the banker, lawyer, Indian chief." Would not that be an extraordinarily interesting test?

LUCY BEALES UPHAM.

Boston, Nov. 24, 1908.