cess of nitrification. The soil was spread out in a stable, and maintained at the most favourable degree of moistness for the process, viz., containing from 20 to 25 per cent. In fifteen months it was found that the nitric nitrogen increased from .14 gram to 1.66 gram per kilogram ; while during the same period the organic nitrogen decreased from 3.13 to 2.57 gram per kilo. The total increase in nitrogen, therefore, during this period was .96 gram per kilo. With another soil treated in the same way the increase was as much as 2.09 gram per kilo.

From these results, it will be seen that the decrease in organic nitrogen was not sufficient to account for the increase in the amount of nitric nitrogen, they apparently justify the assumption that a considerable amount of the free nitrogen of the atmosphere had been fixed by the soil during the period of the experiment. To make sure that no increase in ammonia, due to the absorption of ammonia from the fumes in the stable, took place, a check experiment was kept going simultaneously, and was protected from all chance of absorbing ammonia fumes. When the moisture was allowed to fall below a certain percentage, it was found that the fixation and nitrification of the nitrogen was almost completely checked.

The risks attendant upon the admixture of certain combinations of the fertilising elements—nitrogen and potash—are strikingly exemplified by the results of some experiments carried out by Professor Goessmann at the Massachusetts Hatch Experiment Station. In the course of these experiments it was found that mixtures of the two manurial ingredients, nitrogen, and potash, in the form of muriate of potash and sulphate of ammonia, invariably gave much lower results than mixtures containing sulphate of potash and sulphate of ammonia. Since the experiments were carried out under exactly similar conditions, as to character of soil and general mode of cultivation, it was concluded by the investigator that the mixture of muriate of potash and sulphate of ammonia suffered some unfavourable change when incorporated with the soil. To ascertain, if possible, the explanation of this unfavourable action of the mixture some of the dry mixture of muriate of potash and sulphate of ammonia was dissolved in water, when it was found that the muriate of potash was converted into sulphate of potash ; while the sulphate of ammonia was changed into chloride (or muriate) of ammonia (sal ammoniac). Sal ammoniac, it is well known, exercises a most unfavourable action on growing plants. It is well to bear in mind, therefore, that on no account should these two substances be mixed together in a manure.

The question of the reversion of soluble phosphates in superphosphate has recently engaged the attention of Professor Stocklasa, in France. The general opinion is that the reversion of the soluble phosphate is due to the presence of iron and alumina compounds in the superphosphate; but experiments conducted by Professor Stocklasa in his laboratory led him to the conclusion that the retrogression of the phosphoric acid in the superphosphate is very largely dependent on the amount of free phosphoric acid present.—*Ex.*

PLAIN TALKS ON BACTERIA AS APPLIED TO FARM PROBLEMS.

Continued.

EFFECTS OF EXTERNAL CONDITIONS ON BACTERIAL GROWTH

Effect of Temperature.—All kinds of life are limited in their ability to grew. Only within certain temperatures is development possible. Above and below these limits, the bacterial cell, as well as all other forms of life, becomes dormant, and, in many cases, finally loses its vitality. With bacteria in a growing stage, these limits correspond, in a general way, with those that affect other kinds of life, although they are semewhat broader. Most bacteria are unable to thrive below 40 or 50 degrees F. This explains why it is that foods, such as meat, eggs and butter, keep so well, when put in cold storage. The bacteria are not killed at these temperatures, but it is too low for them to grow. Just as corn fails to sprout, if it is planted too early in the spring, when the ground is cold, so these bacteria are held in check, until a favorable temperature awakens them into activity.

The rapidity with which bacteria growth takes place, gradually increases with the temperature, until the blood heat 98 to 100 degrees is approximated, then quickly diminishes. Bacteria that produce disease grow most rapidly at about 100 degress F., the temperature of the warm-blooded