

every square inch of the earth's surface : that contains 12 lbs. of nitrogen at 16c. ; very nearly \$2 per square inch or \$288 per square foot. If we calculate at these rates the value of the atmospheric nitrogen resting upon a square acre it amounts to twelve and a half million dollars and on a farm of 100 acres one thousand two hundred and fifty millions. It would be quite interesting if we were to give a history of the attempts that have been made to realize or fix this nitrogen and get it into the form of ammonia, nitric acid or cyanogen. But the chemists have all failed to do this economically and the only person who has it in his power to utilize it to a certain extent is that humble individual the farmer.

For nearly a century and a quarter the question of the utilisation of nitrogen by plants has been a subject of controversy among scientific men. It was the famous Priestly who began it in 1771. He and, a few year's later, Ingenhous pointed out that plants are able to assimilate very appreciable quantities of nitrogen from the air. Saussure denied this, so did Woodhouse and Sennebier, all of them basing their conclusions upon experiment. The famous Liebig also wrote on the same sides. Then the question slept until 1851 when Boussingault renewed the controversy and both he and George Ville from their experiments maintained the affirmative side of the discussion. A commission of the Academy of Paris took their side, but later Cloëz, Mène, Hartung and Gunning came to an opposite conclusion. In 1861 Lawes, Gilbert and Pugh ranged themselves on the negative side, but Bretschneider two years later made experiments with lupins and dwarf bean plants obtaining most positive proof of the assimilation of atmospheric nitrogen. Perhaps the conflicting conclusions previously arrived at had been owing to a want of sufficient care in the observations made on different sort of plants. In any case Bretschneider's results only confirmed what was known about the cultivation of the papilionaceæ away back in the time of the Romans. W. Strecker has disinterred a passage in Pliny (Natural History: Book XVIII.) of which this is a translation ; "Lupins, Lentils or Pulse require so little manure that they in fact replace it; Vetches make the land fertile. Corn should be sown where previously lupins, vetches or beans have stood, because these only make the land more