

material influence upon the result of the experiment. Its effects are never soon apparent when it is sown in dry weather; but if the season is damp so that the white powdered gypsum adheres to the leaves and stalks of the young grass, the good effect is then immediate. This observation was made, many years since, by Arthur Young, by Mr. Smith, and by the American farmers; it is a well-known fact with the sainfoin growers of the Berkshire and Hampshire chalk formations, the clover cultivators of the gravels and loams of Surrey and Kent, and on the lucern grounds of the alluvial soils of Essex and Middlesex. The farmers of the United States, when dressing their turnips with gypsum, always found it answer best when spread in rainy weather."

The Crops which Gypsum Fertilizes.—The highly fertilizing power of gypsum upon sainfoin, and some of the circumstances which modify it, were well ascertained by Mr. Smith's experiments in three years of the last decade of last century. The soil on which the experiments were made was a light vegetable earth, three feet deep at the upper end of the field, and gradually lessening to three inches at the lower end, and everywhere incumbent on a subsoil of chalk; and the field was divided into equal breadths for gypsed and ungypsed growths of sainfoin, with every precaution that the circumstances should as nearly as possible be equal. In one experiment, the crop on the deeper ungypsed soil amounted to 3,357 lbs. of the dry herb, and 419 lbs. of seed; while that of the contiguous breadth, which had received about 15 bushels of gypsum in the spring of 1794, amounted to 5,462 lbs. of the dry herb, and 582 lbs. of seed. In another experiment, the crop on a shallower and ungypsed part amounted to 2,766 lbs. of the dry herb, and 245 lbs. of seed; while that upon the contiguous part, which had received about 15 bushels of gypsum in the spring of 1792, amounted to 4,381 lbs. of the dry herb, and 379 lbs. of seed. In a third experiment, the crop on the shallowest part, ungypsed, amounted to 2,068 lbs. of the dry herb, and 66 lbs. of seed; while that upon the contiguous part, which received about 15 bushels of gypsum in the spring of 1794, amounted to 4,879 lbs. of the dry herb, and 211 lbs. of seed; and that upon the same part, gypsed with 15 bushels also in the spring of 1792, amounted to 4,310 lbs. of the dry herb, and 205 lbs. of seed. Thus the crop from the ungypsed breadth being taken as 100, that upon the gypsed breadth is 231—it is more than doubled. But on comparing the weight of the herbaceous portion with that of the seed, widely different relations are apparent; for the proportion of herb to seed in the ungypsed portion of the first experiment was as 100 to 2.5—in the gypsed portion of that experiment, as 100 to 10.7; in the ungypsed portion of the second experiment, as 100 to 8.9—in the gypsed portion of that experiment, as 100 to 8.7;

in the ungypsed portion of the third experiment, as 100 to 3.2—in the once gypsed portion of that experiment, as 100 to 4.3; and in the twice gypsed portion of that experiment, as 100 to 4.8. Both without and with gypsum, therefore, the proportion of the seed to the herb falls rapidly off from the deep soil to the shallow. Some principle essential to fructification was hence supposed by Mr. Smith to be very deficient in shallow soil; and this principle, in all probability, is some portion of the compound product of decomposed and decomposing organic matter.

The fertilizing power of gypsum upon white clover was ascertained by Mr. Smith to be still greater than upon sainfoin. He applied the gypsum in connection with his crop in the proportion of six bushels per acre, at an advanced period in May, when the clover looked pale, and seemed to want sap; and only a fortnight afterwards, though no rain fell in the interval, the clover was vigorous, and began rapidly to form so thick a covering as to protect the ground from an intense sunshine, which scorched every adjacent ungypsed spot. In one experiment, the ungypsed crop amounted to 839 lbs. of the herb, and 56 lbs. of seed, while the gypsed crop amounted to 2,226 lbs. of the herb, and 316 lbs. of seed; and in another, the ungypsed crop amounted to 500 lbs. of the herb, and 61 lbs. of seed; while the gypsed crop amounted to 2,270 lbs. of the herb, and 174 lbs. of the seed. The mean of these experiments shows the increase from gypsing to have been as 225 to 100. M. Villele's experiments do not show so largely; yet, in consequence of having been made on moist, stony, clayey soil, of about 16 inches in depth, and incumbent on a stiff clay subsoil, they are quite as decisive and considerably more interesting. In one of his experiments, gypsum was applied in the proportion of 4 cwt. per acre, and the ungypsed dry crop amounted to 20 cwt. 1 qr. 23 lbs., while the gypsed dry crop amounted to 40 cwt. 3 qrs. 19 lbs.; and in another, gypsum was applied in the proportion of 5½ cwt. per acre, and the ungypsed dry crop amounted to 19 cwt. 2 qrs. 16 lbs., while the gypsed dry crop amounted to 32 cwt. 2 qrs. 27 lbs. So far as past experience discloses, gypsum may, perhaps, be pronounced less variably and more certainly beneficial to clover than to any other agricultural plant; and it has often the curious property of materially benefitting clover in such a manner as to render the effect observable only when the crop is converted into hay. "I have tried gypsum on a great variety of soils," says Dr. Shier, "in general with but little success. In a few instances, however, it proved highly beneficial to clover. In these cases I observed that the advantage could not be detected by the eye, or even by the balance, when the produce was weighed green; but it was very apparent on weighing the dried hay."

The fertilizing power of gypsum upon legu-