

of nitrogen of the two, and it will also grow the larger amount of barley in the following year.

These results are obtained in a field with an area of about eight acres divided into four portions, of which one-fourth has grown barley every year for a long time, and the other three parts have grown occasional crops of clover. What we have not yet been able to prove in this experiment is, whether the subsoil has or has not lost nitrogen. The surface soil of the garden plot, of the bean field, and of the field where leguminous plants are continually grown, have lost nitrogen, but not in proportion to the amount of nitrogen removed, that is to say the land which is alternately wheat and fallow has lost more nitrogen than the leguminous plant land, which might be explained by the fact that the leguminous plants take a portion of their food from the subsoil.

On account of the great difference which we find in the character of our subsoils, it is difficult to suppose that analyses, however correct they may be, could be satisfactorily employed to measure the loss of nitrogen. For instance, this year we opened six holes, each nine feet deep, in the field to which I have alluded; on two lucern had been growing for some years, on two white clover, and on the other two, alternately, fallow and wheat. These holes were all within a few yards of each other in the middle of a level field, and to all appearance the surface soils were exactly alike. In order to follow the sampling iron downward it was found necessary to excavate a hole about twelve feet in circumference. In most of the holes the chalk was not reached, but the character of the clay varied exceedingly, and in one part of the same hole the chalk came within about three feet of the surface, while in another part the clay was found nearly down to the bottom. It was noticed that when the lucern roots came in contact with the chalk, they made no attempt to penetrate it, but spread out in a fine network of roots over its surface. I think we may accept it as a fact that leguminous plants do take up a large amount of nitrogen in some form from the subsoil.

Prof. Atwater's suggestion that hostile organisms are in some degree the cause of the failure of clover has not been overlooked by us. It would appear, however, that so long as the plant finds abundance of food—as in the case of the garden clover—it is capable of resisting any such attack, even for so long a period as 32 years. In Great Britain red clover is not repeated on the same soil under eight or twelve years, other leguminous crops being employed in the interval. This would lead us to think that leguminous plants either take different foods from the soil, or that they take the same food at different depths.

Another part of the field under leguminous plants is also, as I mentioned above, under continuous barley, and I have noticed a remarkable difference between the amount of underground life in the two soils. Birds rarely settle on the barley portion, while they are always hunting for food on the other parts of the field. Moles, too, are most troublesome among the leguminous beds, though I rarely, if ever, see their work on the barley land. Common earth-worms are likewise very abundant, and, as far as I can judge, they destroy many of the clover plants—at all events, I have frequently found earth-worms in the crown of plants, the leaves of which have suddenly withered, and I may say that underground life generally appears to be far more active and abundant under the influence of leguminous growth, than under that of the cereal crops.

Although there are difficulties in either case to be got over, whether we attempt to account for the nitrogen of the leguminous having its source in the atmosphere, or in the soil, it still appears to me that there are more difficulties in forming a rational theory on the former supposition, than on

the latter. Theories, however, are of very little use in a question of this kind. What is really required is more facts, and unfortunately these are only accumulated by very slow and laborious processes: (1)

TROTTING STALLION.

ABE DOWNING.

The above engraving is said to be a good likeness of the young trotting stallion Abe Downing, owned by Messrs. J. H. & W. R. Bowman, Waverly, Iowa. He is a bay, bred by James Miller, Paris, Kentucky; got by Miller's Joe Downing, son of Alexander's Edwin Forrest; dam by Harrison, son of Park's Highlander; 2d dam the dam of Dick Jameson (2 26). It will be observed that Abe Downing is nearly a full brother in blood to the famous Dick Jameson, one of the fastest trotters ever bred in Kentucky, both being by the same sire, and the dam of the latter being the second dam of the former; so Abe Downing only misses being standard by a scratch, his sire and his second dam both being standard under the rules of the Breeders' Trotting Stud Book. But Abe Downing has other claims to merit aside from his distinguished ancestry; and if he does lack a scratch of being standard in blood, there is but little doubt of his ability to make himself "solid" under the rules, by his own performances on the turf. Last season, with but little preparation, and on a half-mile track, he won a race, taking the second, third and fourth heats—time, 2:36½, 2:34½, 2:36½, 2:35. We will not undertake to say how fast this young horse can trot when in condition, but will simply state that this record is no measure of his speed from what we have heard of him. He was foaled in 1875, and is now just about old enough to show his mettle. The Messrs. Bowman are recognized as among the most intelligent and enterprising breeders of the Northwest, and are capital judges of stock. In addition to the extensive stable of trotting horses owned by these gentlemen, they are also largely interested in Percheron-Norman horses and Shorthorn cattle. Of the former they have several of the best of Mr. Dunham's various importations, and of the latter it will be difficult to find better ones in the herds of the most noted breeders in the land.

BUTTER IN THE FUTURE.

The following very judicious remarks, altho' from Illinois, U. S., meet our case exactly in Canada. Butter may sell with difficulty in July and August, but excellent butter will pay as well or better the year round than the most sought-for farm produce.
E. A. B.

"Knowing that we are somewhat engaged in the breeding of Jersey cattle and the sale of farm-made Jersey butter, our friends ask, in view of the low price to which butter has fallen, "what are you going to do about it now, with your high priced Jersey cows, and butter selling so low as 15 cts. per pound?" Our answer is that we expect to go right on as usual, except perhaps to be more watchful for the improve-

(1) I find in my New York papers that, in spite of Dr Hoskins' opinion to the contrary, the red-clover plant is beginning to show signs of fatigue. After my long experience of the plant in England, I know what a loss it would be to all farmers if the same unhappy sickness, which at one time rendered the cultivation of red-clover hopeless there, should affect that legumen in this country. I therefore earnestly advise my readers not to sow red-clover more than once in eight years.
A. R. J. F.