

this superficial cart about a foot deep of earth—ditch-scrappings, &c., anything will do—, and on it lay the loads of dung as fast as you can draw them until the depth of earth and dung is about 2 feet. Then, having spread the dung already laid down pretty level, cart the rest on to it, making the horse draw cart and all on to the top of the heap, and spreading each load as it is up-set. When all is drawn on to the mixen, throw up any loose dung that may be lying about, trim up the sides, making them as square as possible, level the top, and cover it with about a foot of earth of any kind. The manure will not stand much chance of losing its valuable properties, if treated in this way.

Ten days before you intend using this mixen, give it a turn-over; throw all the outsides into the middle; break up every lump; mix the top and bottom layers of earth well with the dung, (1) and let the heap heat; the heat will kill most of the seeds of weeds—and there will be seeds of weeds in all manure however well the cultivation may be looked after—the manure will be of equal goodness all through—not, as too often is the case, rotten dung here, and straw there—and, being thoroughly made, will, as soon as it is deposited in the land, be ready to at once provide the plants with their suitable nourishment.

I fancy I can always tell a good farmer by the neatness of his mixens.

In carting dung on to the mixen, towards the last, it may be necessary to take small loads, or, what is much better, to have a *trace-horse* to help the one in the shafts.

I do not think you could find a farmer in our best cultivated districts in England who does not treat his manure in the above way. (2)

Agricultural lectures.—The newly established County Councils, in England, have already inaugurated a set of lectures on agriculture on a very liberal scale, but the farmers do not seem to be too well affected towards them. Mr. Hunter Pringle, a well known *agronome*, and, at the same time a first-rate practical farmer, doubts very much if paying young lecturers \$25 a day, and travelling expenses, for addresses that leave no practical effect behind them, is a wise proceeding. He believes that science, to be palatable or nutritious, must be delivered in combination with practice, but he thinks it "very doubtful whether science can ever be generally useful to farmers. There are numerous questions concerning the composition of soils, food, manures, &c., upon which our most learned authorities differ among themselves." For instance, at a lecture followed by a discussion, at Cirencester, the other day, the subject of which I have forgotten, I find that Prof Voelcker did not agree with Prof. Lloyd, and both of these learned and experienced agricultural chemists disagreed with Prof. Rinch of the Royal Agricultural College!

Aryan.—In professor Couture's article on the Canadian horse, in the April number of the Journal, he speaks of the "Aryan type, with flat forehead." It may interest some of my readers to know that we ourselves are of the Aryan race. The word is Sanscrit, and means "the plougher," the root being *ar*, which appears in our words *earth*, *harvest*, *heart*, &c. So, in the English Bible, the text "The oxen that *car* the ground," means the oxen that plough the ground. In the Scotch saying, "two months from earing to shearing," the meaning of course is, from the time wheat comes into ear until reaping-time.

(1) At the farm above mentioned in Sherbrooke St., one row of dung carted from a heap was good rotten stuff, the next two rows were all straw, the heap had never been turned. How can the potatoes grown with it be an equal crop?

A. R. J. F.

(2) Except, of course, those who feed their beasts in sunken boxes.

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Green-manuring.—The last part of professor Paul Wagner's lecture, on "The cheapest way of obtaining nitrogen and phosphoric acid" is now before my readers, and one lesson, at least may be learnt from it. the ploughing in of any other than leguminous crops is useless as far as the capture of the free nitrogen of the air is concerned. Thus, buckwheat, green rye, and other crops of like nature are not endowed by nature with the same power as pease, clover, lupines, tares, and beans.

For a long time, farmers were told that if they grew a heavy crop of tares or clover and fed it off with sheep, the land was not enriched unless the sheep received an additional supply of food—cake, grain or beans—imported from another piece of land. He knew better, because his experience showed him that; on good land, he would grow *too good* a crop of barley after such a treatment of a field. Why, this was so, the chemists of that day could not tell him, neither could they explain why a better crop of wheat could be grown after a twice or thrice cut crop of clover unmanured, than after a manured root-crop.

Then came the theory that nitrogen was assimilated by the leaves of plants. This, however, was speedily disproved by Boussingault, fifty years ago, and Sir John Lawes, some twenty years after, showed that in plants grown in sterilised soil, there was no evidence of the assimilation of free nitrogen; that is to say that if leguminous plants are grown in sterilised soil with the ashes of similar plants added, and so enclosed as to keep away all microbes, there is no gain of nitrogen.

Now came Hellriegel and Wilfarth, two Germans, who showed the connection between the assimilation of nitrogen and the existence of nodules, containing organisms, upon the roots of leguminous plants. They found that if a portion of the soil of a field in which a crop of the same kind as that under experiment had been grown were added to the sterilised soil in which the experimental plants were to be grown, nodules on the roots would be formed and nitrogen gained. Lawes and Gilbert having tested and approved of the truth of this decision, we may now safely conclude that "the fixation of free nitrogen in the growth of leguminous (*pou-beary*) plants under the influence of suitable microbe-infection of the soil, and of the resulting nodule-formation in the roots, may be considered as fully established."

Well, it is satisfactory enough to know that our old-established practice of growing wheat after clover, and barley or oats after pease, is founded on a rational theoretical basis. But I do hope no one will immediately run away with the idea that all we have to do is to sow plenty of leguminous crops, plough them in, and sow grain. I was sorry to find so thoroughly a practical farmer as Mr. MacPherson, at the agricultural meeting, this spring, stating that he sowed clover every third year. If he continues in the same road, I can assure him he will find before long that his land will refuse to grow clover at all. Had he seen, as I have seen, thousands of acres of the finest grain-producing land in the Eastern Counties of England become clover-sick, so sick that they would not grow that invaluable plant under any compulsion, he would pause in his dangerous experiment.

Pease and tares, too, are neither of them crops to be played with. On very heavy land, the abundant root-growth of these plants may perhaps be beneficial in breaking up the texture of such soils and making them, so to speak, lighter. But I have known very fine land, of fair consistency, made so "shattery" by the growth of pease, and especially of tares, that, as my old farm-tutor used to say: "There is no use my trying to grow wheat after either of those crops, though the land is full of dung, unless I can first get a crop of turnips or rane. Then, the treading of the sheep in feeding the roots off will solidify the land and the crop will stand up."