Each paper not to exceed one page of the *Journal of Agriculture*.

These papers and essays must be written by practical farmers, and, on butter and cheese making, by makers, directors or proprietors of cheese and butter factories.

AVERAGE CROPS IN U. K.

We are glad to see this, year for the first time, the averages of the ten estimates, up to and including that of 1894, adopted as a standard of yield, instead of the old "ordinary average." The latter is also given, probably for the last time, for comparison, the result being to show how untrustworthy it was. There are ten estimates for all the crops except the hay crop in its two divisions, for which there are time for Great Britain and eight for Ireland and the United Kingdom. In the following table for the United Kingdom (excepting the small islands) the average given is that of the whole of the estimates for each crop:—

CROPS IN THE UNITED KINGDOM.

	Total Produce.		Yield per acre.		
	1894.	1893.	1894.	1893.	Aver.
Crops.	Bushels.	Bushels.	Bush.	Bush.	Bush.
Wheat	60,704 382	50,912,847	30 70	26 08	29.32
Barley	78.600,635	65,745,992	34 77	29 30	33.28
Oats	190,862,714	168,588,121	42.34	38 14	39.03
Beans	7,197,709	4,863,046	29.17	19.61	26.15
Peas	6,229,097	4,756,447	25.64	22.61	25 20
	Tons.	Tons.	Tons	Tons.	Tons.
Potatoes	4,662,147	6,540,593	3 32	5.13	4 48
Turnips	30,677.732	31,110,313	13.53	13 66	13 09
Mangels	7,209,823	5,225,457	18.02	13.26	17.06
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Hops	636 846	414 229	10.70	7 21	7.71
Hay from clov. &c.	98 840 452	63,333,140	35.77	23.55	31.17
Hay from permanent pasture	215,147,265	118,308,622	33.65	20.41	28.23

The great superiority of the harvest of 1894 to that of 1893, as far as bulk of produce was concerned, is strikingly shown by these figures. For the United Kingdom every crop, except potatoes and turnips, yielded much better last season than in the preceding year of drought, and the case of turnips was not an exception in England alone.

For the National Stockman and Farmer.

SHALLOW CULTIVATION.

When one examines the reports of our stations regarding experiments with shallow and deep tillage he finds seeming conflict in the results. This is equally true of the reports made by farm writers. But the weight of the testimony is in favor of shallow culture of all, or nearly all, crops. The variation in results is due to character of soil, the particular season in which the experiments are made, and sometimes the tillage itself, some going to the extreme of barely scratching the soil and failing to stir all its surface. As we do not know all the circumstances many get the impression that it is all chance any way, and that shallow culture is a fad and has no particular value.

The longer I study and practice shallow and level culture, the surer I am that it is best for my own soil, but in a different soil I think I can see that it might give poor results. Very few hard and fast rules can be laid down for our guidance in agriculture. There must be variation to suit varying conditions. Tillage is no exception. In the case of potatoes especially it has been insisted that the roots of plants must not be disturbed, and that the surface of the soil must be kept level for best results, but there are cases in which deep tillage may be best, and also where ridge culture is best.

Shallow cultivation does not necessarily consist in merely scratching the surface of the soil. In fact it should consist of more than that. In using the sweeps of a Planet Jr. cultivator I have noticed that when they are set to run very shallow there is not always enough loose earth to protect the moisture in the soil beneath. Then, too, the tramping of the horses firms the soil, and the cultivation may not be deep enough to loosen the soil in the track. For these and other reasons tillage at all times should be at least two inches deep. This is shallow tillage, as is mere scratching of the surface. I now believe that I have sometimes made a mistake in setting the cultivator so very shallow—even at the last cultivation of a crop. (1)

Deep tillage is that which cuts off many good feeders of a plant in the middle, and shallow tillage is that which stirs the top soil well while leaving the roots alone. The plant roots that run within two or three inches of the surface can not serve the plant well when a drouth comes, and the few that are so near the top of the ground should be sacrificed to that the others may be protected by a well stirred covering of soil. We go to an extreme when we fail to run the teeth or shovels deep enough to make a mulch of dry earth on the surface, and are safely practicing shallow cultivation so long as we do not go deeper than three inches, at least a few inches away from the plant. The old idea was that we should stir the soil five or six inches deep when ever we cultivate, thus breaking off the roots of the plants, and this is what the advocates of shallow tillage oppose. In one case there is thorough stirring of the soil regardless of the roots, and in the other there is thorough stirring of the surface of the soil, leaving the roots unpruned. In all soils of good mechanical condition the latter method is certainly preferable.

But deep tillage at the expense of broken roots may be a necessity when land is in bad condition. In the case of potatoes, if a soil becomes hard packed by rains, being deficient in vegetable matter to hold it up, it often becomes necessary to sacrifice some plant roots in order to get the soil loosened up once more, as potatoes cannot form in a hard soil, unless the season is very wet. It is very true that it is better not to plant potatoes in such land until after a crop of vegetable matter has been given it, but if the potatoes have been planted then deep tillage pretty late in the season may do much more good than harm. Potatoes want a loose soil, and the true way is to keep a soil loose by incorporating decaying vegetable matter with it rather than by deep plowing; but if this is not done deep tillage in some seasons is a necessity.

Surface and level cultivations go together naturally. If a soil be cold and wet, level culture is not so good as ridge culture. Those who have land that is wet are naturally inclined to condemn level cultivation, but if they were thoroughly to underdrain such land their practice would incline to change. In wet seasons deep cultivation and ridging of rows does no harm, but in hot and dry summers the more level we can keep the soil the cooler and more moist it will be; and if the tillage be only from two to three inches deep, but thorough so far as it goes, the plant roots are left undisturbed, and are permitted to do the work for which they are intended. (1)

ALVA AGEE.

(1) All depends upon the crop: horse-hoe roots deep, corn shallow after roots begin to run, as any decay in ripening owing to the necessity of forming fresh roots must be injurious.—ED.

EXPERIENCE WITH HAY CAPS.

EDS. COUNTRY GENTLEMAN—Your correspondent, W. C. G., on page 419, inquires about hay caps. The inquiry is an important one, and perhaps an experience of several years, and a study of caps and the method of applying, may be of sufficient value to warrant the taking up of some space in your paper.

Experience proves that the following are necessary essentials—1. Lightness and ventilation; 2. Fastening the cap with cords; 3. Quickness in applying.

I think I have found all these; and as success is made up of attention to small matters, you will pardon me if I am painfully minute.

As to the first point—my favorite hay cap is made of common drilling or heavy sheeting, a yard square. This is sufficient impervious to rain; it does not require to be removed to allow the escape of moisture from beneath, and it is large enough to protect the vulnerable point—the top of the cock. To these may be added its cheapness. It is made by hemming on a sewing machine, and turning up the corners and sewing across, to make a kind of loop, into which the cord (a yard long) is inserted. The cord is a hand-spun manilla wrapping or binder twine.

The paper caps are objectionable, on account of the collecting of moisture underneath.

2. I have tried fastening caps with sticks run into the corners, but many times we have wind storms that will blow a well made cock over, or the top off below the cap. To hold a tall cock together under a high wind, it is necessary to fasten it at the bottom, and cords must be long enough for this purpose.

3. Taking a cap with cords, there are three methods of applying:

(*a*) Driving stakes into the ground at the four corners and tying the string to them. This is too slow. It would be an exceptionally good man who could put on a cap in this way in two minutes. Suppose you have a hundred caps. It would take 200 minutes, or three hours and twenty minutes; and, besides, 400 stakes make a respectable load of wood. Furthermore, it requires too much time to remove the caps and pull up the stakes and gather them up.

(*b*) Tying the strings to stones. This would require, for a hundred caps, at least 300 lbs. of stone to be carted on to a respectable mowing field.

(*c*) The method I have worked out. The free end of the cord is permanently fastened to the middle of a small hardwood stick, twelve inches long. Sticks shorter or longer than this do not work well. When caps are made, and in removing from cocks afterward, the sticks are laid together in the middle of the cap, two corners or sides folded over the ends, and then the caps are rolled quickly around the sticks. Attention to this small detail prevents the vexatious tangling of strings. Thus made and rolled up, a man can carry about 25 caps on one arm.

In applying the caps, a man either takes an armful, or a boy takes a wheelbarrow load, and passes down the field between two rows of cocks, tossing caps toward the cocks on either side. Then returning, or men following, the cap is picked up and laid on top of the cock, and unrolled, and the sticks tossed over to place. Then, passing around the cock, a stick is taken, and if the cord is too long, the slack is taken up by quickly rolling around the stick, one end is inserted under the edge of the cock, lifted up and the other end set upon the ground, and the job is done, and so well done that Boreas may get upon a rampage and crack his lungs to no effect, while the men serenely eat their supper before the sun goes down.

Sometimes, however, on cocks of Hungarian, high as your head, the strings prove too short. In this case the stick is inserted into the hay at any convenient point.

In this fashion of putting on hay caps, one smart man can put on a hundred caps in much less than a hundred minutes, and he can remove them and roll them up ready for future use in half the time.

I maintain that this method of putting on hay caps makes hay caps practicable. As to their value, I have had clover beautifully cured under a square yard of drilling during a seven day's rain. I have had Hungarian come in sweet and bright after standing out eleven days, with only one interval of passable hay weather, long enough merely to tip the cocks over and double them up.

J. N. PARDEE.

(1) *Very good indeed.*—ED.

Hay Caps.—I have had several years' experience with the Symmes, as well as the home-made article of two-yards-wide unbleached muslin. The former are very good when new, but after a few years become somewhat flattened, so that the shocks have to be made inconveniently large or very flat in order that the edges may rest firmly against the hay, to prevent blowing off. In case of continued and frequent showers, partially cured clover will spoil at the top of the shock unless the caps are removed often, and sometimes it is difficult to do this and not get caught in a shower with shocks uncovered. My cloth caps are made six feet square, with pieces of the same cloth about ten inches long, doubled about an inch wide, sewn on the cor-