


operations in time, and where there is scope for neither of these improvements, in the lessening of the expenses of cultivation and consequent increase in his net profit. Since these three objects cannot be nearly all that is meant by the improvement of agriculture, I am sure that a concentration of effort in this direction will bring about a great measure of agricultural improvement.

Iron Plough—A defence.

The Department of Agriculture has been for many years past experimenting on the use of improved ploughs especially to suit the various conditions of land in this country. Though many ryots visit the different agricultural stations with the idea of judging the merits of the improved implements and introducing them in their estates the realisation of the result of such visits has been slow indeed.

In the Central Farm ploughs of various patterns have been tried successfully and the ryots visiting the farm note their efficiency keenly enough and as a result there has been a fairly large sale of monsoon ploughs but they could have been much more had it not been for their wrong conception that the ploughs are too costly to be purchased and their work demands the ryots to maintain more costly cattle and skilful labour and so on.

The ryots do not also understand that an ordinary country blacksmith can do the repair to the plough if ever it requires any. Besides, these iron implements do not require frequent repairs and do not  easily.

Therefore, I shall attempt to show in the following lines how it is more economical and advantagous to use improved implements in preference to the ordinary country implements, in the supreme utility of which, the ryot has a blind faith. A good

plough when worked should cut the soil in furrows of a rectangular cross section and turn the slice over, breaking it in the operation leaving the unploughed land clear for the next furrow to pass. These ideas are fully borne out in the working of an improved plough. The country plough on the other hand, cuts a furrow, triangular in section leaving small ridges between two furrows, throwing the soil on either side. To have the soil properly ploughed the ryot has to pass the country plough lengthwise and crosswise several times. Therefore practically speaking the seemingly cheap and unskilled labour is much wasted in working the country plough. Further the breaking of a furrow slice is not possible in working with a country plough.

Considering these questions and practical experience it has been clear to the user of an improved plough that the work it does, while passing over an area once, is at least as efficient as a country plough worked several times. Another advantage in an improved plough is that the depth of the furrow could be regulated. These facts will weigh more in favour of the improved plough when we take into consideration the amount of labour expended, not to speak of the time saved. To understand this it may be necessary to measure the pull required to work each of these ploughs in terms of cwt.

The country plough has a draught of $2\frac{1}{2}$ cwts. with a dead weight of 50 lbs. Sivagiri plough or Meston plough fitted with iron body and steel share have got the same draught although their dead weights are 50 lbs. and 36 lbs. respectively. Monsoon plough having a dead weight of 60 lbs. has a draught of 3 cwts. The Sivagiri Meston ploughs are more often used in wet lands and the Monsoon in dry lands. Comparing the country plough with the monsoon plough the country plough cuts a section of $\frac{4 \times 5}{2}$ sq. inches = 10 sq. inches for $2\frac{1}{2}$ cwts. whereas the Monsoon plough cuts a section 4×5 sq. inches = 20 square

inches for a draught of 3 cwts, worked at the same depth. Therefore the proportion of work turned out is 1:2 while the proportion of draught applied is $2\frac{1}{2}$:3.

Taking the initial cost in the case of a country plough as Rs. $2\frac{1}{2}$, it has to be completely renewed at least every year, whereas the Monsoon plough which costs Rs. 15 has a chisel tip now worth 5 annas which can be easily replaced; the rest of the plough remains in-tact for a long time except for the share piece that has to be replaced once in 5 or 6 years at a cost of twelve annas. The ryot, therefore, gains a good deal if he purchases a monsoon plough for Rs. 15 in preference to a country plough worth Rs. $2\frac{1}{2}$ or Rs. 3.

I think it may be necessary here to detail the various points that contribute to the comparatively less draught for the work turned out and the durability of an improved plough. The draught is always proportional to the work turned out with due consideration to the friction that has to be overcome which is proportional to the roughness of the plough-share and to the bluntness of the cutting edge. The polished steel parts of an improved plough that come in contact with the soil cannot offer as great a frictional resistance as the rough wooden parts of a country plough.

A wrong idea is often entertained about the dead weight of an iron implement in considering the draught and the figures mentioned above have shown that the dead weight has little to do with the draught when the friction of the cutting parts is at a minimum.

The efficiency depends partly on the sharpness of the cutting edge. In an improved plough by tempering the steel share soft at top and hard at bottom which causes unequal wear, the sharpness of the cutting edge is maintained. As regards durability it is needless to mention that iron lasts longer than wood, specially

when the parts liable to be worn out are small detachable pieces and can be replaced with ease and at a small cost.

A. K. Subramania Aiyar.

Notes.

A paper on Grasses and Forage plants of Hawaii by the Agronomist of the station appears as Bulletin No. 36 of the Hawaii Agricultural Experiment Station. Several important grasses and forage plants are described therein. A list is also given of the undesirable and poisonous plants that are met with there and it includes among others the following that occur also in Southern India as indigenous or introduced. *Acacia Farnesiana* known as Peevalam in Tamil and Gabbu Thumma in Telugu, *Andropogon halepensis* (Johnson grass) 'difficult to eradicate,' *Chrysopogon* (*Andropogon*) *aciculatus*, *Lantana Camara* (*Lantana*), *Momordica Charantia* (Chinese cucumber or Carilla fruit) cultivated everywhere and *Psidium guayava* (*Guava*) are said to crowd out and replace the plants which have forage value. *Asclepias curassavica* (*Milkweed*), *Leucaena glauca* (*Koa bush*) which seems to cause falling of hair from horses' tails and known as Tagarai in Tamil, *Ricinus communis* (*Castor bean*), which causes abortion and *Tephrosia purpurea* (*Kolingi*) are said to be poisonous. C. T.

It has been found that some plants are able to absorb and assimilate various sugars including lactose. Lactose was found utilised by vetch, radish and onion. For maize the sugars in order of preference by the plant are glucose, levulose, cane sugar and maltose while for vetch, they are cane sugar, glucose, maltose and lactose. K. U. K. M. (Expt. Station Record. U. S. A.)

Barbado Department of Agriculture sugar cane experiment report shows that Sulphate of Ammonia when compared to dried