

required, and their production in the *easiest* and most effective way and at the *lowest* possible cost is a problem that might well engage the attention alike of the peasant and the king.

It is possible, too, that the attempts that have hitherto been made in this direction (for attempts have been made) have been based upon false premises. Indeed this is almost certain. Thousands of years before Cincinnatus followed the plough beside his neat little Roman cottage in fields that smiled on Tiber, the principle that has shaped the tillage of the world was propounded, whether by Tubal-Cain or later, mankind will never know. At any rate, it was practised alike by the Philistine in the days of Saul, the peasant of Attica in the time of Miltiades, and in earlier and later epochs amongst many nations and peoples widely scattered, and is now adopted by every nation on the earth that pretends to cultivate the soil. We refer to that mode, based upon the principle of doing it by means of *sliding traction*, which governs nearly all the methods now in vogue, as harrowing and cultivating, but more particularly that operation called *ploughing*, which up to the present time has been looked upon as indispensable to the successful production of a seed-bed for crops on a large scale.

So wedded to this method has the world become that anyone who has the hardihood to pronounce the principle as *radically defective* must first encase himself in armour that is scorn-proof. Ancient principles are venerable as well as ancient institutions, and when encrusted in the successive coatings of the approval of the centuries, it will take a sharp mattock indeed to break the encasement; and yet this is the very task that the inventor of the Modern Steam Farmer has taken upon himself. In the calm confidence of full assurance he approaches this mountain with the full expectation that it will one day become a plain, although he may not live to see it. Beside the cemetery where his ashes are soon to lie the peasant will till the soil by a very different process. He charges the principle as being *defective at its base, defective at its centre, and defective at its apex—wholly defective*, notwithstanding the approval of the generations of, it may be, fifty buried centuries.

Tillage by the Methods of Sliding and Rotatory Traction Compared.

Now, reader, come and let us reason together for a little. You are aware that it is a fundamental law in mechanics, that the amount of resistance to a *sliding* traction is much greater than to that of a *rotating*. Now, the methods of tillage by means of the plough, etc., are conducted on the former principle, and the power that propels these implements is therefore much greater than that required to perform these operations on the principle of *rotatory motion*, had we the proper implements and facilities for conducting them on this principle. The proportionate difference in the amount of the power required will be apparent if we compare the difference in the amount of the power required to draw a certain weight over the surface of the earth in the form of a wagon or in the form of a sleigh, when the ground is bare. Fancy our farmers performing all the operations of the farm requiring the use of the wagon in summer by means of the iron-shod sled! In very despair they would every one forsake the heritage of his father and