they would only require to be empted about six times a year; thus the ammoniacal salts would be fit for immediate use.

WM. CHAPMAN.

Nottingham, June 21, 1861.

MY DEAR CHAPMAN,—You are about right in applying to me in regard to the economy of town urine, as, if only for the interest I take in the salubrity of Nottingham, I shall have pleasure in devoting my next 'Practical Paper' to the question at large; and will, in a few days, probably be able to send you a proof. Meanwhile, I throw out a few hints for your satisfaction and guidance.

No doubt, urine is valuable; but, like every other manure known in agriculture, all its practical value depends upon its management. In the case of Peruvian guano, the base of which is urate, accident has supplied apparently the most effective means of enhancing the value of the manure by so disposing it *in situ* and saturating it with the salts and liquid exudations of decomposing matter, as to economise most perfectly its ammoniacal properties for fertilizing the earth. And I must confess that the readiest mode of dealing with the urine of the farm-yard at home seems to me to be that which I have recommended in the first of my 'Practical Papers for Farmers' Clubs'—to keep pumping it over the dung heap.

I am however, aware of one instance in which very valuable manure based on urate, or altogether one, was manufactured by Messrs. Tennant and Co., of St. Rollox, Glasgow, and employed with immense advantage by that very eminent and strictly practical farmer, the late Mr. John Finnie, of Swanston, Edinburgh.

This salt, which I suppose is still made and sold by Messrs. Tennant, is produced I believe, by digesting the urine in a tank with other substances, and Mr. Finnie found his advantage in being able to substitute this production at £5 a ton for Peruvian guano at £12.

The great difficulty in the way of Nottingham would be in using up the fresh urine. There is no exception of which I am aware to the law of putrid or decomposition in the action of agricultural stimulants. The decomposition may be volatile, or it may be percipitant; the manurial substance may have a tendency to go off into aerial gases, or to subdue into liquid putrefaction; but decomposition in some sort must ensue before any manurial value accrues. Now, the great value of urine arises from its rapid capacity of putrefaction, owing not only to the amount of ammoniacal salts which it holds in solution, but to the quantities of animal matter it retains in mechanical suspension. To prevent the participation of the latter, agitators must be kept at work in the tank or receptacle where the urine must be kept for preservation; so that you are met with a difficulty at the very outset; for if you could expect a farmer to take off the liquid manure, you must necessarily save and husband it for him in the first instance. But farmers will not readily be induced to take off the supply. I do not think you are likely to meet with even one so disposed; for most farmers find it more to their purpose to cony experiments that have already proved successful (and this, indeed, they are willing and ready to do) than to embark in doubtful attempts, however clear they might feel convinced of their scientific accuracy.

It seems to me, then, that whenever there might arise an opportunity for a corporation or other public body, showing what could be done to convert the national waste into productive value, it might eagerly be embraced upon public grounds. And then, when the salvage of urinary and excrementitious matter had become in this country as much a part of our fertilizing economy as in Flanders and in China, the agriculturists would catch the spirit of the movement, which I feel satisfied might thus be introduced, and would thenceforth save the sanitary bodies throughout the kingdom all anxiety respecting the cost of economising the civic voidings.

But what means are to be adopted of preserving the liquid exudations pure? I have a wholesome recollection of having been worsted long ago whilst conducting the *The Agricultural Journal*, by Dr. Skae, of the Royal Lunatic Asylum at Morningside, whom I had accused of polluting the stream of the Jordan (a river resembling the Leen), and wasting much fertilising matter, by running off into it the sewage of 600 inmates. In reply, the doctor certified and sent me a jar of the water. I had it analysed by Dr. Anderson, the Highland and Agricultural Society's distinguished chemist, and it proved to appearance valueless, being, of course, much diluted; although as pure water fertilises, this might not in the result have greatly affected the efficacy of the sewage applied as liquid manure. Your Nottingham urine must necessarily to some extent be collected in a diluted state, as, of course, you have to keep the urinaries sweet, as at the principal railway stations, by the constant trickling of the fresh water, which we will assume dilutes the urine to half its extent or weight with water. If there were more water than urine, the weights would be however, about equal, owing to the difference of specific gravity. You are to take this fact into account, then, in estimating, by quantity, the value of the urine so collected; and besides it must be remembered that although 2,000 visits may be paid to the urinaries during the day, these are not to be reckoned as the yield of 2,000 individuals. On the whole, I do not suppose that more actual urine would be caught for economical purposes than might have been derived from the 600 individuals at Morningside.

Well, but how are you to conserve and apply it? A pipe and a reservoir appear utterly indispensable if this is to be done; and then the question becomes one of expense. The plan I