tances, and to endeavour to explain the reasons why in others it does no good, or is attended with but partial success. The question of profitable return for the expense of proper arrangements for the distribution of liquid manure is one for after consideration; it may overrule or not the theory which informs us that in the liquid form manuring constituents are most conducive to the rapid development of certain kinds of agricultural produce. But we must first examine carefully whether this doctrine can be accepted unconditionally, or whether this very generally received opinion has not to be modified in a considerable degree. A principle like that which informs us that fertilising matters produce their maximum effect in a liquid form may be true in the abstract, or with reference to particular kinds of plants, or in certain climates, or with reference to soils of a particular character; but in other climates, or other soils, there may be operating causes which render it by no means advisable to administer manuring matters in a state of solution.

On the composition and fertilising value of liquid manure.—Liquid manure, it need hardly be said, may be produced in a variety of ways. It may consist chiefly of the fermenting urine of horses, or cows, or pigs, or a mixture of them all, or it may be produced by converting the *solid and liquid* excrements of our domestic animals into a muddy liquid, and distributing this liquid, mixed with an immense bulk of water, over the land by means of fixed pipes and steam engines The latter was the practice of Mr. Mechi—a practice not likely to be followed out in this province, and which may, consequently be put aside altogether.

I have taken very great pains to compare the five analyses of liquid manure, executed by Professor Voelcker for the Royal Agricultural Society of England, with each other; they are published in the Journal of the society for 1858, and the average composition is as follows: 7000 grains, evaporated to dryness on the water-bath, furnished 60.112 grains of solid residue, dried at 212° F. This quantity on burning gave 36.196 grains of mineral matter or ash.

Analysing the ash, it was found to contain in a hundred parts:

Soluble silica	2.76
Oxide of iron	.19
Lime	6.96
Magnesia	4.24
Potash	31.02
Chloride of potassium	21.55
" " sodium	12.72
Phosphoric acid	2.63
Sulphuric acid	10.39
Carbonic acid and loss	7.54
	100.00

Of these, the quantity of potash is considerable, the quantity of phosphoric acid very small.

The following numbers express the per cent composition of the solid matters after drying at 212° F.:

* Organic matters	18.40
Inorganic do	81.60
	100.00
* Containing nitrogen	1.33
Equal to ammonia	1.61462

And then consider through what an enormous bulk of water this trifling amount of ammonia, potash, and phosphoric acid is diffused! But I referred above to the late Mr. Mechi's practice at Tiptree Hall. The liquid manure drawn from the tank at that place contains a notable quantity of phosphoric acid, but far less alkaline salts than the average, and Dr Voelcker expressly states that many drinking waters in daily use contain more solid matter in solution than Mr. Mechi's tank-water. Please recollect that the real value of all manuring matters is mainly dependent upon the amount of nitrogen, phosphoric acid, and potash which they contain; the magnesia, chloride of sodium, &c., are usually superabundant, at all events they will be present in all fairly cultivated soils in sufficient quantity to supply all the demands of the plants.

In the Government report by Mr. Austin, C. E., on the "Means of Deodorising and Utilising the Sewage of Towns," published in 1857, the author gives a short account of a visit to Mr. Mechi's farm, and, amongst other particulars relating to the working expenses for distributing liquid manure at Tiptree, states on p. 57:—

The quantity delivered daily in ten working hours would be 130 tons of water; but Mr. Mechi estimates the cost of delivery at from 1½ d. to 2 d. per ton, the specific gravity of liquid manure being so much greater than water. There will be delivered over the whole farm, on the average, from 45,000, *to* 50,000 *gallons* of liquid manure per acre per annum.

Taking our previous calculation into consideration, and assuming that the composition of the liquid manure does not vary materially at different periods, 50,000 gallons of liquid manure, thick and thin together, would yield 50,000 × 5,476 grains, or 273,000 grains of ammonia: in round numbers 39 lbs. of ammonia.

Now, the best Peruvian guano yields about 10 0/0 of ammonia, and is worth £13 a ton; 4 cwt. would be wanted to supply the 39 lbs of ammonia above-mentioned, or, in value, 52 s. For this outlay of money the same amount of ammonia would be obtained which is yielded by 50,000 gallons of of Mr. Mechi's tank-liquid. The potash and phosphoric acid in the guano are much more than equivalent to the potash and phosphoric acid in the tank-liquid; and taking all things into consideration, I would far rather trust to the guano than to the tank-liquid. To get the benefit of the one, you *must* use the 50,000 gallons of liquid, and only think what a dose that would have been in the recent seven wet seasons in England!

On the character of soils upon which Liquid Manure is applied with manifold benefit, and of the reasons of success:

Experience has shown that liquid manure produces the most beneficial and striking effects when applied to light, deep, sandy soils, resting upon a porous subsoil. However poor originally such a soil may be, after repeated applications of liquid manure it is rendered capable of yielding remunerative and even large crops; as in the before-mentioned case of Flanders.

Provided the subsoil be well drained or naturally porous, it may be safely asserted that *any* sandy soil, however sterile in its natural state, may be made to yield heavy crops through the instrumentality of liquid manure. Indeed, the poorer the soil the more striking would be the result.

For poor sandy soils, the system of liquid manuring cannot be too highly recommended, particularly in a climate like ours of the province of Quebec; always provided that a brook or stream of some kind flows past the farm buildings, into which the general drainage of the yards, stables, &c., run naturally, as more especially set forth in my article on irrigation, v. Journal, Dec. 1883.

In order to render more intelligible the explanation of the highly beneficial effects which liquid manure produces under