

## SEWAGE FARMING—KIRKINTILLOCH AND FORFAR FARMS.

OF the method of sewage disposal by sewage farming, but little is known, in a practical way, on this continent, the sewage farm at Pullman, Illinois, being probably the only one on this side the Atlantic. At considerable expense, we this month lay before the readers of the JOURNAL details, illustrated, of the process as adopted in two towns in Scotland, and which applies to the process as practiced in the other places, now including quite a number of towns in England. For copy of the illustration and the text, for the most part, we are indebted to the Glasgow Sanitary Journal.

THE KIRKINTILLOCH FARM; BY WM. WHITE-LAW, M.D., F.F.P.S.G. HEALTH OFFICER.

On May 27th, 1886, the first sod of the sewage works of Kirkintilloch was cut, and the work has steadily progressed under the supervision of Mr. Copland, the engineer for the burgh. The scheme is that which he recommended in 1876. The Townhead of Kirkintilloch being situated on a height, it has been found advisable, in order to minimize the cost of pumping, to construct two main outfall sewers, one for the higher parts of the burgh, and the other for intercepting the sewage of the low-lying portions. Both reach from different points the filtration beds at Dryfield. The works at Dryfield consist of a storage tank, a distributing and screening tank, and the various channels and conduits connected therewith, and several filtration beds, covering at present an area of nine acres. The storage tank referred to is situated at the end of the low-level sewer, and holds 107,000 gallons. Its diameter is 45 feet, and it is divided into two compartments by an 18-inch brick wall, to admit of one compartment being cleaned while the other is being worked. The principal object of the tank is to store the sewage passing down the low-level sewer during night, and in this way to restrict the operation of pumping to the ordinary working hours. Besides this, it allows the pumping to be restricted during the day to the shortest possible time which the pumps will admit of—that is to say, with sufficient machinery, the pumping can be limited to two or three hours in the morning and two or three hours in the afternoon, leaving the tank empty to receive the night flow.

The machinery at present being provided consists of a 9-horse power Otto gas engine and one of Messrs Gwynnes' No. 5 centrifugal pumps, these being guaranteed to raise 900 gallons per minute to the required elevation. Provision is being made for doubling this plant when found necessary.

The sewage pumped from the low-level sewer will discharge along with that from

the high-level or gravitation sewer into the distributing tank situated at the upper corner of the filtration areas. After passing through the screening tank the sewage will be directed by a number of sluices into the various distributing channels, and by them carried to the filtering beds. These consist of twelve plots of ground averaging  $\frac{1}{4}$ th of an acre of area in each, there being four plots in the length and three in the breadth of the ground occupied. Each plot has had its surface brought to a perfect level; and as the ground originally sloped slightly to the river Kelvin, the plots in each division rise in terraces, one above the other.

The main sewage carrier is led along the upper edge of the filtration areas, and branch carriers are led down between each set of plots, provided with valves opposite the end of each, so that the sewage may be run on to the surface of any one, or more, as required.

The filtration beds are prepared to receive the sewage by spade work. First of all a main channel is formed from the sewage outlet along the centre of each plot, and then from this main channel smaller arteries are carried right and left across the ground at intervals of four or five feet, the whole ground when prepared forming a series of ridges and furrows resembling the "lazy beds" to be seen in some places for the cultivation of potatoes. The sewage flows along and fills all the furrows, but but is not allowed to rise so far as to touch the vegetables grown on the ridges. The furrows retain any solid matter, and a sub-soil drain, laid at a depth of from 6 to 7 feet, is led along beneath the top of each terrace to intercept and carry off the effluent water which percolates through the soil. It is found that, with a favourable sub-soil, composed of gravelly sand like that at Dryfield, the effluent is very small and quite unobjectionable. These sub-soil drains are connected with a main outfall which discharges the effluent into the Kelvin.

The size of the farm at Kirkintilloch is 24 acres, and the population of the burgh 8,000; but, as already pointed out, only 9 acres have been laid out for cultivation. A large portion of the remaining 15 acres can be used for purposes of irrigation, and ultimately as the town increases, will be laid out in the same way as the 9 acres.

Since the scheme was begun, an arrangement has been entered into between the Kirkintilloch Commissioners and the Cadzow Parish Authority, whereby the former undertake the drainage and disposal of the sewage of South Lenzie. The main outfall sewer for this district is joined to the high-level outfall sewer leading to Dryfield.