

drain, which is 6 ft. deep. The beds were made to slope towards the main drain by a fall of 1 in 150.

The cost of laying out the 20 acres of filtration area was considerable, and including engineering expenses and charges exceeded \$20,000.

Surface Irrigation.—Adjoining the filtration areas the remaining 50 acres were laid out for surface irrigation by Mr. Samuel Harpur at comparatively little cost, and the results have been satisfactory. Owing to the subsidence of the ground by reason of colliery workings the drainage of the farm of late years has been attended with great difficulties, and a considerable sum of money has been expended and is being spent in continuing the effluent conduit to a point nearly half-a-mile below the boundary of the farm.

The Lower Sewage Farms Near Abercynon.

Before dealing with these farms, situated outside the county borough of Merthyr, it will be appropriate to refer to the agreement made in January, 1878, between the Merthyr Local Board and the Aberdare Local Board, the effect of which is, that the sewage of the Aberdare district is taken over and disposed of on the farm lands, and the control and management of all the sewage farms is in the hands of a joint committee, consisting of seven members, four appointed by Merthyr and three by Aberdare. Since the formation of the "Joint Farms Management Committee" an agreement has been entered into to take over and dispose of the sewage of the Mountain Ash Council's district (excepting Abercynon), and the sewage of Trelewis in the Gelligaer district is also disposed of in the same way.

The main sewer for discharging the sewage of the county borough of Merthyr on to the "lower farms" is about 6½ miles in length from the Troedyrhiw straining tanks to the Merthyr straining tanks at Parknewydd farm, and consists mainly of a 24-in. brick barrel culvert with wrought-iron tubes where valley depressions occur. The serious subsidences caused by underground coal mining have greatly affected the sewer as originally laid. The area of the lands originally acquired has been lessened by the giving up of several acres for colliery works, railways and sidings. The actual area of the portions of the various farms under sewage treatment is as follows: Upper Common, 32 acres; Ynyscadudwg, 83 acres; Parknewydd, 42 acres; Berwerdy, 55 acres; Glyncoch, 13 acres.

Before the sinking of the new colliery pits the Merthyr sewage was distributed on the lands east of the river and was only strained at Troedyrhiw. The author carried out a diversion of the original sewer, syphoned it across the river, and constructed a pair of straining tanks on the west side, near the Aberdare tanks. The Merthyr tanks are each 158 ft. by 9 ft. by 6½ ft. deep, divided into two settling and four straining compartments; the sludge is run out on to land at a lower level, by the opening of hinged covers over pipes laid from the bottom of each compartment at a steep gradient. Owing to the difficulty and expense of transport the sludge is a drug upon the market, nevertheless, many tons have been sold from time to time. The straining material in the tanks is the gravel of the district.

The whole of the land of the lower farms consists of porous alluvial soil about 16 in. thick overlying a thick bed of gravel, a section of which is visible near the effluent. The existence of the gravel subsoil has obviated the necessity of draining the land except to a very slight extent.

The farms are all treated by surface irrigation. The population draining on to them may be estimated at 105,000.

With respect to the analyses of the sewage and sewage effluents, the periodical reports of the county medical officer contain tables which invariably show that a satisfactory result is obtained, the average percentage of purification calculated on the oxygen absorbed being about 81 at Troedyrhiw and 86 at the lower farms, and on albuminoid ammonia 80 and 90 per cent. respectively.

It may be fairly claimed that the working of the Merthyr sewage farm, both at Troedyrhiw and Abercynon has been successful, and while the stipulation that "profit is to be subservient to the proper disposal of sewage" has been strictly adhered to, the pecuniary result has been satisfactory. Tak-

ing an average over the last ten years, the yearly general expenditure on all the farms has been \$9,705.00, and the yearly revenue \$13,720.00, showing a profit over and above the working expenses of \$4,015.00 per annum. The profit is applied by dividing it between the Merthyr and Aberdare Councils in the proportion of the populations of the respective districts, or by carrying out works chargeable to capital account. Judging by the results of operations extending over many years, there appears to be good reason for adopting the system of using sewage as a land fertilizer, wherever suitable land can be obtained, and such land is not infrequent in river valleys. If possible, take sewage to the hungry land, not to the sea.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

(Continued from Page 596.)

5167—August 11—Granting leave to the C.P.R. to construct, maintain, and operate a branch line of railway, or spur, to and into the premises of Thos. Abriel, Nakusp, B.C., in the west division of Kootenay district, Province of British Columbia.

5168—August 13—Approving of C.P.R. Company's Standard Freight Tariff, applying between stations on the Ontario division of its new line of railway between Toronto and Sudbury, Ont.

5169—August 13—Granting leave to the C.P.R. to operate its trains over the interlocking plant at a point where its railway crosses the railway of the G.T.R. near Asylum, London, Ont.

5171—August 14—Authorizing the Central Telephone Association to erect, place, and maintain its wires across the tracks of the G.T.R. at four different points in the Province of Ontario.

5172—August 14—Granting leave to the G.N.W. Telegraph Co. to erect, place, and maintain its wires across the track of the C.P.R. at the camp grounds at Petewawa, Ont.

5173—August 14—Granting leave to the Land Farmers Mutual Telephone Company to erect, place, and maintain its wires across the track of the C.P.R. at Land, Province of Saskatchewan.

5174—August 14—Authorizing corrected plans of the Kettle River Valley, showing location of railway from Grand Forks northerly to Gloucester, Divisions 1 and 2, Province of British Columbia.

5175—August 13—Amending Order No. 5133, dated the 31st of July, A.D. 1908, said Order authorizes the Brockville Water Commissioners to lay and maintain a six-inch water main under the tracks of the G.T.R. where it crosses Bartholomew Street, Brockville, Ontario.

5176—August 14—Authorizing corrected plans of the Kettle River Valley Railway, showing located line of the North Fork Extension in Divisions 1 and 2, Province of British Columbia.

5177—August 5—Approving proposed re-arrangement of the signalling equipment and gates of the C.N.R. at crossing where its line of railway crosses Queen Street in the City of Toronto, Ontario.

5178—August 14—Authorizing the C.P.R. to construct, maintain, and operate branch line or spur to and into the premises of the Great West Coal Company at Roche Percee, Sask.

5179—July 29—Granting leave to the Municipal Council of Wollaston, to construct and maintain diverted highway across the track of the Central Ontario Railway in Lot 11, Concession 8, of the Township of Wollaston, Ont.

5180—August 18—Authorizing the Bell Telephone Company to erect, place, and maintain its aerial wires across the tracks of the G.T.R. at public crossing at Queen Street, Ailsa Craig, Ont.

5181 to 5187, inclusive—August 14—Granting leave to the rural municipality of Woodworth to erect, place, and maintain its wires across the tracks of the C.P.R. at seven different points in the Province of Manitoba.

5188 and 5189—August 14—Granting leave to the Land Farmers' Mutual Telephone Company to erect, place, and