

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—29 West 39th Street, New York. President, H. L. Holman; Secretary, Calvin W. Rice.

SOCIETY NOTES.

International Association Testing Materials.

The Fifth Congress of the International Association for Testing Materials will be held in Copenhagen early in September, 1909. Arrangements for this congress are already actively in progress. The proceedings of the Congress will consist largely in official reports of standing committees and individual references on scientific subjects relating to the testing of materials. By action of the council, non-official papers by members of the Association to be presented at the Congress will be restricted to the following subjects, as being, in the judgment of the council, of chief importance: Metals,—(a) Metallography; (b) hardness testing; (c) impact tests; (d) testing metals by alternating stresses, thermal treatment, etc.; (e) testing of cast iron; (f) influence of increased temperature on the quality of metal. Hydraulic cements: (g) Reinforced concrete; (h) progress in the methods of testing; (i) cement in sea water; (j) constancy of volume; (k) tests by means of prisms and standard sand; (l) weathering resistance of building stones. Miscellaneous: (m) Oils; (n) caoutchouc; (o) wood; (p) paints on metallic structures. The work of this Congress will be extremely interesting and valuable, and those engineers specially interested should place themselves in communication with the general secretary of the International Association, 11, Nordbahnstrasse 50, Vienna, Austria.

THE MERTHYR SEWAGE FARMS.*

By T. Fletcher Harvey, M. Inst. C.E.,
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Merthyr has the distinction of having at a comparatively early period grappled with the problems of water supply and sewage disposal, for half a century has passed since the waterworks were commenced, preparatory to the sewerage of the district.

It was in 1858, after several projected schemes, that the Merthyr Local Board obtained an Act of Parliament for the construction of waterworks, and by 1862 the supply had been given to Merthyr from the river Taff Fechan at an intake 6 miles north of the town. In 1863 the impounding reservoir, with a capacity of 350,000,000 gallons, was completed. The cost was only \$410,000, including 41 miles of water pipes from 14-in. to 2-in. diameter. It prepared the way for the sewage disposal works.

The system of sewerage adopted was the combined drainage system, and the network of sewers chiefly consists of earthenware pipe sewers. Very shortly after the temporary outlets had been made into the already polluted river Taff complaints arose, which resulted in an injunction by the Court of Chancery to restrain the Merthyr Local Board from continuing to pour their sewage into the river, and from connecting house drains with the sewers, until some satisfactory process for the purification of the sewage had been devised and put in operation. The sewerage works were therefore suspended. Quoting from the late Mr. Samuel Harpur, engineer and surveyor to the local board: "The question of the purification of the sewage was thus forced upon the attention of the board. They found it necessary to adopt some means by which the sewage of a population of 50,000 persons should be cleansed daily, and hourly, as it issued from the sewers. Various schemes were under consideration, but none of them seemed to meet the requirements of the case, until in April, 1869, a comprehensive scheme for the disposal of the sewage by using it in the irrigation of land was prepared by their

surveyor and was at once received with general approval." The scheme consisted in acquiring and laying out for irrigation about 90 acres of land within the district at Troedyrhiw, and 300 acres of lands without the district, 10 miles south of Merthyr, and in May, 1869, it was ordered that the surveys be proceeded with and the necessary legal steps be taken. In April, 1870, an inquiry into the merits of the scheme was held at Merthyr, on behalf of the Home Secretary, who, in the following month, issued a Provisional Order for the purchase of the necessary lands, which was, after strenuous opposition in both Houses, confirmed by Parliament.

Meanwhile the Court of Chancery suggested that some means should be adopted for mitigating the nuisance, by straining the sewage before discharging it into the river, but the owners of the land at the most suitable site refused to sell, and the local authority were driven to the expedient of constructing two elongated straining tanks under the parish road. After the construction of these tanks the Court of Chancery directed Mr. Bailey Denton to proceed to Merthyr. As the result of his visit and examination he designed and recommended the formation of natural sewage filtering areas.

In those days there were few precedents for sewage farming on a large scale as proposed by the Merthyr sanitary authority, and it is not surprising that much time passed before the final decision was arrived at. Moreover, opinions expressed by the Rivers Pollution Commissioners were not altogether favorable to the general adoption of the system.

Troedyrhiw Sewage Farm.

An address at the annual meeting of the South Wales branch of the British Medical Association, held in Merthyr in July, 1872, "On the Downward Intermittent Filtration of Sewage as it is now in Practical Operation at Troedyrhiw," by Dr. Dyke, gives a clear account of the work done and the results obtained. The author thinks the following quotations from it worth recording: "We were placed under the professional care of Mr. Bailey Denton, who, after due consideration, recommended that the new remedy suggested by Dr. Edward Frankland should be tried at Merthyr." The first volume of the report of the Rivers Pollution Commission published in July, 1870, gives an account of the extensive and interesting series of experiments made by Dr. Edward Frankland, one of the commissioners. "The conclusions arrived at may be thus summarized: Sewage traversing a porous and finely divided soil undergoes a process to some extent analogous to that experienced by blood in passing through the lungs in the act of breathing. A field of porous soil irrigated intermittently virtually performs an act of respiration, copying on an enormous scale the lung-action of a breathing animal, for it is alternately receiving an expiring air, and thus dealing as an oxidising agent with the filthy fluid which is passing through it. The action of the earth as a means of filtration must not be considered as merely mechanical; it is chemical, for the results of filtration properly conducted are the oxidation, and thereby the transformation, of the offensive organic substances, in solution in the sewage, into fertilizing matters, which remain in the soil, and into certain harmless inorganic salts, which pass off in the effluent water."

Straining Tanks.—The pair of straining tanks just referred to were each 200 ft. by 5 ft. by 5 ft. deep, with a centre longitudinal drain, and divided into three bays by open brickwork. The space between the walls was filled with broken furnace slag. The sewage sludge left on the surface of the straining slag was removed and taken to the land, each tank working four or five days. These old tanks were abandoned in 1896 because of the nuisance of clearing the sludge in close proximity to the highway. The sewer was diverted, and a pair of new tanks designed by the author were built on the farm. The sludge is removed by means of light steel tipping wagons, running on a 2-ft. gauge railway, slightly falling in the direction of the load.

Filtration Areas.—About 20 acres of the farm were laid out by Mr. Bailey Denton into four separate filtering areas, and underdrained to a depth of from 5 ft. to 7 ft. The land is a loamy soil 18 in. thick overlying a bed of gravel. Lateral drains about 60 yards apart run towards the main or effluent

* Paper read before the Convention of Engineers and Surveyors.