for the latter was left substantially undeveloped. Toward the middle of the present century, when cities began their modern rapid growth, the question of purification of sewage forced itself upon the communities. This was particularly the case in England, where many towns, using rivers as sources of water supply, also use them as the most convenient depositories for their waste water, to the detriment of the towns below.

Broad irrigation was recommended and applied with more or less success. The leading idea was to have vegetation absorb, and thus to dispose of the sewage as it was delivered upon the fields. One acre was considered necessary for the sewage from about one hundred to two hundred persons. But not everywhere was suitable or sufficient territory to be had, and seldom was this method of disposal found to pay the cost of properly applying the sewage to the land.

It was then suggested in England that in porous soil sewage could be purified by filtration, and would require much less territory, namely, one acre of land might serve form six hundred to one thousand persons, according to the porosity of the soil. This method was found to be successful in purifying sewage when the ground was carefully prepared in level beds and furrows, and underdrained, and when the application was intermittent.

Where no porous ground was obtainable, or where its preparation was too costly, filtration was not feasible, and still other methods of purification had to be sought. It was known that milk of lime, salts of iron, and other chemical agents, would coagulate some of the albuminous compounds, precipitate organic matter and thus clarify the liquid. The deposited "sludge" could then be treated as manure. A multitude of processes for precipitation were patented, and some were practically tried. The general results in brief were these: The clarified liquid was still more or less impure, and soon putrefied if left standing. If discharged into a river, however, and diluted with fresh water the discharge was not objectionable. The deposited matter, or "sludge," was, however, rarely of sufficient value as manure to justify the expence of drying and preparing it for the market. Owing to the cost of the chemicals and handling the sewage, the cost of precipitation was often prohibitory.

In the meantime, those cities which were situated upon large rivers or on the coast, disregarded all methods of land and chemical treatment, and turned the crude sewage directly into the passing currents of water, generally because it obviated the the cost of providing special works for purification.

Eeach of the three above mentioned methods of sewage disposal began to have its advocates, and we can find a voluminous literature setting forth the advantages peculiar to each. An impartial observer examining the various executed works for sewage disposal would come to about the following conclusions: Each one of the above methods has merits, and is capable of accomplishing the desired object under favorable conditions. A preference of one over the other should rest upon the desired degree of purity and upon the relative cost. Where a direct di-charge into a large river or into the sea is not objectionable, it will generally be the least expensive method of disposal. Where such a discharge is impracticable, either a partial or a complete purification can be obtained by straining the sewage through screens, which will prevent floating matter from standing upon the shores or in shallow places. A much better partial purification is obtained by collecting the sewage in tanks and treating it with precipitants. The effluent water in this can be made clear and discharged into a stream or along the ocean beach with impunity. Where the stream is to be thereafter used for a water supply the effluent from precipitation works is usually unsatisfactory, unless it can afterwards be subjected to land filtration.

Filtration through land unquestionably accomplishes a greater degree of purification than can be obtained by any other method of treatment. If the conditions