other information be required I can give it to your committee in person.

As a result of this report the Education Committee made the following recommendation to the City Council, who adopted it on May 24th:—

Passed.—That, subject to the sanction of the Board of Education, provision be made for the treatment of the teeth of necessitous school children by establishing a dental clinic with a whole-time officer, at a cost, for equipment (including instruments), estimated not to exceed £100, and for maintenance estimated not to exceed the amount produced by a rate of $\frac{1}{4}$ d. in the £ per annum (£435).

THE PROTECTION OF SHELL FISHERIES.*

By CHARLES GRANT PUGH, M.D., D.P.H.,
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THE preventive measures adopted in the past against typhoid fever in the Borough of Southend-on-Sea have been detailed in the annual reports for previous years by Dr. Clough Waters and Dr. Nash, my predecessors as medical officer of health. As a result of the bringing up to modern standards of the house drainage in the older portion of the town, and of the care taken to prevent the consumption of shell-fish obtained from doubtful sources, a marked fall in the incidence of typhoid fever can be traced between the years 1893 and 1904, the number of indigenous cases per 1,000 inhabitants declining from 9·7 in the former year to ·23 in the latter. The incidence, however has since remained approximately constant, being ·34 in 1905, ·29 in 1906, ·35 in 1907, and ·348 in 1908, and the majority of the cases which have occurred in these years have been associated with the consumption of oysters, which, however, were not obtained from a fish shop or a reputable oyster dealer, but were either picked up by the patient or his friends from the foreshore of the Thames Estuary or bought from street hawkers who had themselves obtained them in a similar way. Not only have many of the cases which have arisen in the borough been attributed to shell-fish procured in this manner from other than properly protected beds, but medical officers of health of some London boroughs and extra Metropolitan urban districts have assigned the cause of many of the cases which have arisen in their districts to the consumption of shell-fish either gathered by the patients themselves when on a visit to the neighbourhood or sent to them by their friends.

The foreshore of the Thames Estuary is admitted to be unusually fertile as regards shell-fish, especially oysters, which rapidly "fatten" and improve in condition when deposited on it. By no

stretch of the imagination, however, can it be regarded as a "properly protected shell-fishery," from which alone should oysters be taken for human consumption without prior purification, and this was recognised by the Council as long ago as 1897, when upon Dr. Waters' advice they extinguished at considerable cost an oyster fishery which up to that time had existed on the foreshore. The consumption of oysters gathered from the foreshore at any portion of the estuary must necessarily be regarded as not free from danger unless such shell-fish has first been placed in pure layings for a sufficiently long time to purify. Impressed by this consideration, and being anxious in the interests of the public health that no person should at any rate run any risk of developing typhoid fever from the consumption of oysters gathered from that portion of the foreshore which is owned by the Corporation, the health committee, acting upon a report which I presented to them at the end of 1908, represented to the pier committee (under whose control the Corporation's foreshore is) that steps should be taken to prevent unauthorized persons from collecting shell-fish from it either for their own consumption or for the purpose of sale. The pier committee at once agreed to take action, and pending further arrangements employed three men to watch the foreshore, with instructions to prevent a continuance of the practice of collecting the shell-fish for human food. It was soon found, however, that these men were defied by the offenders, who, accustomed to gather the oysters lying on the foreshore, resented any interference with their supposed rights, and as the then town clerk advised that under existing circumstances proceedings against them might fail on legal grounds, it was apparent that other measures had to be taken.

The suggestion that all the shell-fish on the foreshore should be collected by the Corporation and destroyed was deemed impracticable not only on account of the extent and fertility of the foreshore but because oyster spat, etc., floating in the estuary from perhaps distant beds was constantly being deposited on it; moreover, it was borne in mind that only a portion of the foreshore of the Thames Estuary was under the jurisdiction of the Corporation, that a year or two would elapse before the whole of this portion could be dealt with, during which time the Corporation would be unable to prevent the shell-fish being gathered and perhaps sold for human consumption, and that great expense would be annually entailed for an indefinite number of years to come, owing to the fact that no sooner had the whole of the foreshore been dealt with than it would be necessary to commence again at the portion first attacked.

After much consideration the pier committee came to the conclusion that the best method of

* Annual Report, 1909.

dealing with the question was the leasing of the foreshore to a responsible person or company who should comply with certain conditions regarded by the health committee as being essential in the interests of the public health.

The agreement with the Southend Shell-fish Company, to whom the tenancy of the foreshore was granted for three years at a rental of £10 per annum, stipulates, *inter alia*, that no oysters or other shell-fish (except cockles) shall be removed from the foreshore by the tenants except for the purpose of being placed in suitable beds for a period of time sufficient for purification, and that cockles removed from the foreshore shall before sale be boiled, steamed, or otherwise treated by the tenants so as to render them sterile from a bacteriological point of view; that the tenants use every endeavour to prevent unauthorised persons removing oysters or other shell-fish from the foreshore; that the laying on the foreshore of spat or of any shell-fish obtained from beds elsewhere is prohibited, and that no shell-fish or spat removed from any one portion of the foreshore be deposited on any other portion of the foreshore; and that as far as possible the foreshore be cleared of all shell-fish, more especially oysters, as soon as practicable after they are detected.

It will be seen that these conditions were so drawn up as to prevent any possibility of the return to the old state of affairs in which oysters were deposited in definite beds on the foreshore. It was recognized that it would be impossible to prevent at all times unauthorized persons from gathering the shell-fish and possibly disposing of them for human consumption before purification, and, as the object in view would be defeated if the tenants carried out their operations in such a manner that there would at any time be an increase in the number of edible oysters or other shell-fish lying on the foreshore, clauses were inserted in the agreement so as to preclude any possibility of this occurring.

The leasing of the foreshore was a measure undertaken not with the object of financial gain, but solely with a view to the safeguarding of the public health, not only of the inhabitants and visitors to the borough, but of other districts to which the shell-fish might be sent without purification. The Shell-fish Company selected is a local one, the partners being all prominent tradesmen in the borough. Although doubtless some unauthorised removal of oysters, etc., does take place in spite of the steps taken to prevent it, the terms of the agreement are, so far as I am aware, being carried out by the company, who have in several instances taken proceedings on account of the illegal removal of shell-fish.

Without claiming too much for this measure, I think it may be said that results have justified the action of the Corporation. That some such

steps should be taken to prevent the consumption of oysters from the foreshore before purification was suggested by Dr. Clough Waters in his annual report for 1900, as medical officer of health for the borough, but no measures were taken, except that in the following year, upon the advice of his successor, Dr. Nash, notice boards were erected at intervals along the foreshore, warning the public against collecting the shell-fish, and pointing out that care should be taken to eat only such shell-fish as are cultivated under proper supervision. These notice boards, however, did not remain up long, as their erection did not meet with universal approval in the borough, it being thought to cast a reflection upon the cleanliness and freedom from pollution of the foreshore—an inference in my opinion quite without justification.

Other districts on the Thames Estuary have not shown any corresponding diminution in the prevalence of typhoid fever, and the same remark applies to other seaside towns where the proximity of an unprotected shell fishery has led to an undue incidence of typhoid fever in previous years. Sporadic cases will doubtless continue to occur in our borough; in spite of all warnings persons will continue to eat oysters obtained from other than reputable oyster merchants; cockles obtained from polluted sources and insufficiently cooked may from time to time be sold in the borough notwithstanding constant watchfulness on the part of the health officials; some misguided individuals will doubtless continue to eat before purification shell-fish gathered surreptitiously from the foreshore, either in the neighbourhood of Southend or in the adjoining districts, and a proportion of these will inevitably pay the penalty for their folly by developing the disease; visitors, and in some cases residents, will from time to time arrive in the borough in the incubation of incipient stages of the illness; "typhoid carriers"—*i.e.*, persons who, although seemingly in good health, long after an attack of typhoid fever excrete from time to time typhoid bacilli—may give rise to occasional cases.

Although the consumption of polluted shell-fish was unquestionably the main cause of the excessive prevalence of typhoid fever in past years, it is possible that other factors even now not definitely recognized may have assisted towards the same end, but whether this be so or not they are certainly not now operative, as the typhoid incidence in the borough is far below the average for other English towns, whether inland or on the coast.

With increased knowledge on the part of the public and with the greater attention now paid by shell-fish merchants to the necessity of purifying before sale all oysters, etc., obtained from doubtful sources, one is justified in the hope that in the future cases of typhoid fever will only exceptionally occur, and that deaths from the disease will be correspondingly rare.