general use in that city more than twelve years ago. In selecting mechanical apparatus for the approximation of the fragments in a transverse fracture of the patella, it should be borne in mind that the lower portion drops down principally from gravity, while the upper is drawn up forcibly by the contraction of the anterior muscles of the thigh, consequently a much greater force is required to overcome muscular contraction and draw down the latter than to raise the former. In Mr. Bracey's splint the same amount of force is exerted on both fragments, which I think will prove a serious objection to its use in the eyes of a good many practical surgeons.

REPORT ON VACCINATION AS A BRANCH OF PREVENTIVE MEDICINE.

By ERNEST HART, D.C.L.,

Chairman of the Parliamentary Bills Committee of the British Medical Association.

III.

(Continued from page 599.)

In the town of Willenhall, with 16,000 inhabitants, there occurred between March and July of 1894, 501 cases of small-pox, 30 in children under 5 years of age, and 471 in persons above that age. Of the 30 children, 24 had never been vaccinated, and of these 7 died. Nearly all these 24 cases were very severe, and in the survivors the illness will be followed by permanent disfigurement. Of the remaining 6 cases, 5 had been vaccinated, but in only one instance with any approach to efficiency. All these 5 cases were very mild, and will not be followed by permanent disfigurement. The remaining one of these 6 cases was only vaccinated a few days before the disease broke out, and the attack was a mild one. In considering these figures, it should be borne in mind that there cannot be fewer than 2,000 children in the town less than 5 years old, the bulk of whom are known to be more or less efficiently vaccinated. Of the 22 persons who died from small-pox at all ages, 10 had never been vaccinated; it is doubtful whether 2 others had been, whilst only 3 had four vaccination scars. None had been revaccinated. Dr. Hartill, the medical officer of health, in reporting these facts, deplored the dissemination of doctrines which have led to a growing neglect of vaccination in Willenhall. "Speaking," he adds, "with the knowledge acquired by an experience which only falls to the lot of a few, I can say revaccinated persons are almost proof against contracting small-pox, and for practical purposes I believe them to be quite proof against contracting it in a severe form."

The most recent small-pox scare in London, that which occurred in July, 1894, in the Portland Town district of the parish of St. Marylebone, supplies just the same evidence in favour of vaccination as that provided elsewhere throughout the whole country. Here is an extract from the report of Mr. E. C. Greenwood, the public vaccinator of the parish: "I have from time to time visited the small-pox hospital ships to ascertain the effect of the disease on those vaccinated and those unvaccinated. There have been, up to the present (that is, September 23rd, 1894), 224 cases from St. Marylebone. Of these, 91 were unvaccinated, and 133 vaccinated (of the 133 vaccinated, it is only right to say that a third were but imperfectly vaccinated). Of the unvaccinated there were 22 under 5 years of age, of which 15 were severe, and 7 mild; over 5 years and under 15, 46 cases, of which 33 were severe, and 13 mild; over 15 years, 23 cases, of which 18 were severe, and 5 mild. Of the 133 vaccinated, none were under 5 years of age, 16 were over 5 years and under 15 years, and there were only 3 severe cases; over 15 years there were 112 cases, 31 being severe and 81 mild. There have been only 5 cases admitted into the hospitals of persons who have been revaccinated, all of whom had the disease very slightly, with the exception of 1 who suffered from chronic alcoholism and bronchitis, and ultimately died. There have been in all 19 deaths; of these, 14 occurred in unvaccinated people, and 5 in vaccinated, all the latter being over 23 years of age.

"The effect of vaccination upon the disease is also clearly shown by the length of stay in hospital. From the statistics which I have been able up to the present to get I find the average stay of the unvaccinated is 35 days, and that of the vaccinated 25 days. It is interesting to note that there has been only one case of small-pox occurring amongst all those who have been vaccinated or revaccinated during the epi-

demic. This one case was that of a child of 1½ year of age, who had contracted the disease previous to being vaccinated; the vaccination, however, was beneficial in considerably modifying the attack."

IMMUNITY OF DOCTORS, NURSES, ETC., IN SMALL-POX HOSPITALS.

Undoubtedly one of the most powerful and unanswerable arguments in favour of the usefulness of efficient vaccination and revaccination is the comparative immunity of the vaccinated and revaccinated doctors, nurses, and others employed generally in and around small-pox hospitals. This convincing phenomenon has long been established, but fresh evidence on the point is daily coming to hand. Writing on the subject in *Quain's Dictionary of Medicine*, Dr. Collie, who for many years was superintendent of one of the hospitals of the Metropolitan Asylums Board, says: "During the epidemic of 1871, 110 persons were engaged in the Homerton Fever Hospital in attendance upon the small-pox sick; all these, with 2 exceptions, were revaccinated, and all but these exceptions escaped small-pox. The experience of the epidemic of 1876-77 was of the same kind, all revaccinated attendants having escaped, whilst the only one who had not been revaccinated took the disease and died of it. So, in the epidemic of 1881, of 90 nurses and other attendants on the Atlas Hospital Ship (small-pox), the only person who contracted small-pox was a housemaid who had not been revaccinated."

Not long ago a Vaccination Committee of the Epidemiological Society independently reinvestigated this subject, confining its attention to those "in personal attendance on cases of small-pox," with the result that, out of 1,500 such attendants, only 43 were found to have contracted small-pox, "and not one of these 43 had been revaccinated."

The Highgate Small-Pox and Vaccination Hospital furnishes some very direct evidence on this point, in respect of a lengthened period. In a letter to a friend, dated May 9th, 1893, the late Dr. Herbert Goude, who was at that time medical officer of the institution, remarked that "the statement I made in 1885 that no nurse or other official of this hospital had contracted small-pox, with one exception—that of a gardener who escaped revaccination—holds good to the present date, so that now we have an unbroken record of 58 years, during which no nurse or servant has contracted the disease, even in a modified form; and this, too, though the nurses and attendants on the sick have on many occasions accidentally inoculated themselves with variolous matter, thus putting the protection afforded by vaccination to a really crucial test. We have had no injurious effects from revaccination beyond those apparently inseparable from the operation, such as *malaise* and occasional tardy healing of the vesicles."

Further, on turning to the reports of the Metropolitan Asylums Board for 1892, we find a summary by Dr. T. F. Ricketts, the medical superintendent of the Small-pox Hospital Ships, showing that out of 1,201 persons who had been engaged on board the ships since 1884, and who had therefore been exposed to the infection of small-pox, only 6 contracted the disease, and all recovered. One of these cases was a stoker who had become infected before joining the staff; 2 of the others were vaccinated unsuccessfully on the day of joining only; another was vaccinated unsuccessfully on the day after joining the staff, and with partial success a week later, with the result that her attack of small-pox consisted of "a few spots" only; another of the cases was vaccinated, after joining, on three occasions unsuccessfully; and the sixth case was a ward maid who was vaccinated after joining on three occasions unsuccessfully, on the fourth trial successfully, but too late to prevent her being attacked by small-pox. Her attack was a "very mild discrete" one however. In Dr. Ricketts's report for 1893 we find that of the 307 persons employed on the hospital ships during the year, 6 contracted small-pox and all recovered. In one of these cases the disease developed three days after joining the hospital, showing that the infection had been contracted from an independent source. Of the other 5 cases, vaccination in 2 instances was altogether unsuccessful, and in 3 it was not successful until the third attempt; meanwhile the small-pox

¹ See *Transactions of the Epidemiological Society*, vol. v, new series.

had laid hold of these imperfectly protected individuals, though the attacks were not severe or fatal in any case. During 1893 also 5 temporary workmen employed at the ships caught small-pox and recovered. Four of these men had foolishly evaded vaccination, whilst the fifth, whose attack was a mild one, had been vaccinated twice unsuccessfully. The failure to secure prompt success in the vaccination of these persons is extremely unfortunate, and is accounted for by Dr. Ricketts by the fact that stored lymph has necessarily to be relied upon at the ships.

It is to be hoped that this exposure of a serious flaw in the protective armour of the staff of the hospital ships has led to a revision and amendment of the arrangements in force. It is absolutely essential that attendants, before going on duty, should be efficiently protected, either by vaccination or by a previous attack of small-pox. There should be no doubt in the matter.

To my mind all this goes to prove conclusively the great protective value of vaccination and revaccination. Here we have, between 1884 and 1892, some 1,195 officials of all sorts—doctors, nurses, and others—who have been efficiently protected by vaccination or by previous small-pox, living securely in an infected atmosphere, whilst the remaining 6 who have not been so protected are promptly attacked by the disease; and in 1893 we see 301 efficiently protected officials escape, whilst 6 unprotected of the same group are attacked.

How do these facts compare with those as to the attendants on other infectious fevers? Taking the year 1893, we find that of 2,484 persons employed in the 9 Metropolitan Fever Hospitals, 130 became infected, and 2 died; 4 assistant medical officers, 10 nurses, 43 assistant nurses, and 16 ward servants were attacked by scarlet fever, 2 assistant medical officers, 6 nurses and 15 assistant nurses by diphtheria, 2 nurses and 3 assistant nurses by enteric fever, etc. Comment on this comparison is surely unnecessary.

Throughout the country the experience as to the immunity of properly revaccinated small-pox nurses, etc., is similar to that of London. At Leicester, where the authorities who laugh vaccination to scorn have been challenged unsuccessfully to complete their gigantic experiment by employing none but unvaccinated people as nurses and attendants at their small-pox hospitals, the influence of vaccination and revaccination in protecting the nurses from small-pox has been characteristically illustrated. During the epidemic of 1892-3 there were 40 officials connected with the Leicester Small-pox Hospital. Of these, 34 were efficiently protected, either by previous small-pox or by revaccination, and they all escaped small-pox. The remaining 6, however, were inefficiently protected; they refused to be revaccinated, and 5 of them caught the disease. The only inefficiently protected official who escaped was the matron, who, of course, was not much exposed to the contagium. Dr. Hill, of Birmingham, reports that during the epidemic there in 1893, over 100 persons were engaged on the staff of the City Small-pox Hospital, all of whom had been recently revaccinated. Not one of them contracted small-pox. In Derby the whole of the staff connected with the hospital had been revaccinated, and not one of them was attacked with small-pox. Not one of the 23 nurses, etc., at the Warrington Small-pox Hospital caught the disease during the epidemic of 1893. The same is the invariable and convincing experience at the hospitals at Sheffield, Halifax, and numerous other places of which information is available.

How is it, also, that the deaths of medical men from small-pox are only 13 per million as against 73 per million of the general population; whereas in scarlet fever, against which doctors have no special means of protection, there is the remarkable fact that 59 medical men per million die from that cause, as against 16 per million of the public? When these facts are borne in mind, and accentuated by the remarkable immunity enjoyed in the presence of small-pox by the revaccinated postmen, policemen, soldiers, sailors, etc., the propriety of not only compulsory primary vaccination, but compulsory revaccination at puberty is irresistibly forced upon us.

WHAT IS EFFICIENT VACCINATION?

A careful study of the recent statistics and a comparison of them with the older figures teach a variety of lessons. The

most obvious and important is that, allowing for the few exceptions which prove the rule, efficient vaccination in infancy affords an almost absolute immunity from small-pox up to about 10 years of age, but that after that age the operation needs to be efficiently repeated. Efficiency, however, is a *sine qua non*. Mr. Alexander Wheeler (Q. 8,688 etc., before the Royal Commission) and his antivaccination friends wish to frame their arguments on the assumption that all vaccination—good, bad, and indifferent—must be regarded as equally protective, or rather unprotective, against small-pox. It would be scarcely less absurd to argue that the mere visit to a public vaccinator's surgery should be regarded as proper vaccination, or as sufficient treatment for a broken limb. In view of the lesson taught by a study of the foregoing evidence that a deplorably large proportion of the nominally vaccinated to-day have been most inefficiently vaccinated, and are consequently in many cases almost unprotected against an attack of small-pox, it cannot be too often repeated that efficiency in vaccination is of vital importance. Nothing has done so much to damage the cause of vaccination as the fact that, in consequence of inefficient vaccination, cases of post-vaccinal small-pox, modified though they be by the vaccination, occur in every epidemic. It has been clearly shown to all but the wilfully blind that when the operation has been efficiently performed in the first instance it seldom, if ever, loses altogether its protective property. But so long as medical men are found ready, in their mistaken good nature, to pander to the ignorance of applicants for vaccination, and make only one, or perhaps two, insignificant insertions of lymph in a child's arm, and certify cases of that kind as successfully vaccinated, so long shall we have cases of small-pox occurring in vaccinated subjects, and shall have to struggle against the fallacies and sophistries of antivaccinators. Better let such applicants depart unvaccinated until they learn wisdom than place them in a state of false security, and at the same time endanger one of the greatest prophylactics of modern times.

What, then, is efficient vaccination? To secure it the official instructions of the Local Government Board prescribe that public vaccinators shall "in all ordinary cases of primary vaccination make such insertions of lymph as will produce at least four separate good-sized vesicles or groups of vesicles, not less than half an inch from one another. The total area of vesiculation on the same day in the week following the vaccination should not be less than half a square inch."

There is abundant evidence of the correctness of this instruction, and of the need for its observance as a minimum of efficiency. Between 1836 and 1867 the late Mr. Marson, who as Surgeon of the London Small-pox Hospital had exceptional opportunities of making reliable observations over an extended period, recorded the facts concerning 13,755 cases of small-pox. The results are shown in the following table, which was laid before the Royal Commission by Dr. Thorne Thorne:

Mr. Marson's Cases.

13,755 Cases of Small-pox, Classified according to the Vaccination Marks Borne by Each Patient respectively.	Percentage of Deaths in Each Class respectively.	
	1836-51 (3,094 Cases).	1852-67 (10,661 Cases).
Stated to have been vaccinated, but having no cicatrix	21.7	39.4
Having 1 vaccine cicatrix	7.6	13.8
„ 2 vaccine cicatrices	4.3	7.7
„ 3 vaccine cicatrices	1.8	3.0
„ 4 or more vaccine cicatrices	0.7	0.9
Unvaccinated... ..	35.5	34.9

To the same effect has been the experience of the hospitals of the Metropolitan Asylums Board and of every large town. The following table records the facts as regards 10,403 cases

of small-pox which came under the personal observation of Dr. W. Gayton whilst he was Medical Superintendent of the Homerton Small-pox Hospital and of the North-Western Fever Hospital of the Metropolitan Asylums Board. It was explained to the Royal Commission by Dr. Gayton himself:

Dr. Gayton's 10,403 Cases.

Condition as to Vaccination.	Under 10 Years.			Over 10 Years.		
	Cases.	Deaths.	Per-centage.	Cases.	Deaths.	Per-centage.
Vaccinated, with good marks ...	267	2	0.75	1,818	60	3.3
Vaccinated, with imperfect marks	714	48	6.72	4,140	407	9.8
Said to have been vaccinated, but no visible marks	325	87	26.7	970	265	27.3
Not vaccinated ...	1,187	563	47.4	982	375	38.2

Here is a classified summary of 2,361 cases of small pox treated during 1893 in the Hospital Ships of the Metropolitan Asylums Board:

Character of Vaccination.	Cases of Small-Pox.		Totals.	
	Discrete.	Confluent.	Cases.	Percentage of Deaths to Cases.
Under 10 years of age:				
Having scars of $\frac{1}{4}$ square in. total area ...	21	0	21	0
" " between $\frac{1}{4}$ and $\frac{1}{2}$ square in. area...	12	2	14	0
" " less than $\frac{1}{4}$ square in. area...	19	0	19	0
" " unrecorded area ...	2	0	2	0
Over 10 years of age:				
Having scars of $\frac{1}{4}$ square in. total area ...	794	30	824	17
" " between $\frac{1}{4}$ and $\frac{1}{2}$ square in. area...	215	13	228	6
" " less than $\frac{1}{4}$ square in. area ...	345	21	366	12
" " unrecorded area ...	128	12	140	7
Total vaccinated { Under 10 years ...	54	2	56	0
{ Over 10 years ...	1,482	76	1,558	42
Evidence of vaccination inconclusive { Under 10 years ...	10	9	19	6
{ Over 10 years ...	173	58	231	38
No evidence of vaccination { Under 10 years ...	217	65	282	63
{ Over 10 years ...	140	75	215	31

The following table shows the classification of 1,105 cases of small-pox treated in the Sheffield Borough Hospital in the epidemic of 1887-8, as recorded in Dr. Barry's report:

Character of Vaccination.	Cases of Small-Pox.				Totals.		
	Variceloid.	Discrete.	Coherent.	Confluent.	Cases.	Deaths.	Per-centage.
No visible cicatrix, or 1 only ...	19	47	25	4	95	13	13.
Two primary cicatrices ...	73	132	50	4	259	24	9.3
Three primary cicatrices ...	149	193	27	3	372	21	5.
Four or more primary cicatrices	52	41	5	1	99	2	2.0
Total vaccinated ...	293	413	107	12	825	60	7.2
Unvaccinated ...	0	50	175	55	280	93	33.2

The 590 cases of small-pox which occurred in Warrington in 1892-3 are classified in the following table:

Character of Vaccination.	Cases of Small-Pox.			Totals.		
	Discrete.	Confluent.	Hæmorrhagic.	Cases.	Deaths.	Per-centage.
Under 10 years of age:						
1 primary cicatrix ...	1	0	0	1	0	—
2 " cicatrices ...	5	1	0	6	0	—
3 " " ...	9	1	0	10	0	—
4 " " ...	3	0	0	3	0	—
5 " " ...	4	0	0	4	0	—
Said to have been vaccinated in infancy ...	0	1	0	1	1	—
Unvaccinated ...	7	25	1	33	13	39.3
Over 10 years of age:						
1 primary cicatrix ...	44	15	2	61	4	—
2 " cicatrices ...	156	54	2	212	20	—
3 " " ...	116	30	0	146	7	—
4 " " ...	42	12	0	54	1	—
5 " " ...	3	2	0	5	0	—
Said to have been vaccinated in infancy ...	18	3	0	21	1	—
Unvaccinated ...	6	25	2	33	13	39.3
Total vaccinated { Under 10 ...	22	3	0	25	1	6.4
{ Over 10 ...	379	116	4	499	33	
Total unvaccinated { Under 10 ...	7	25	1	33	13	39.3
{ Over 10 ...	6	25	2	33	13	

From Bristol comes the evidence to be gathered from the following table:

Condition as to Vaccination.	Under 15 Years.			Over 15 Years.		
	Small-pox Cases.	Deaths.	Per-centage.	Small-pox Cases.	Deaths.	Per-centage.
Having 1 vaccination mark { 1887-8 ...	13	0	—	67	7	10.4
{ 1893 ...	2	0	—	25	0	—
Having 2 vaccination marks { 1887-8 ...	19	0	—	78	1	1.2
{ 1893 ...	5	0	—	33	4	12.1
Having 3 vaccination marks { 1887-8 ...	14	0	—	39	0	—
{ 1893 ...	2	0	—	41	3	7.3
Having 4 or more vaccination marks { 1887-8 ...	18	0	—	24	3	12.5
{ 1893 ...	3	0	—	27	1	3.7
Unvaccinated or doubtful { 1887-8 ...	22	12	54.5	33	14	42.2
{ 1893 ...	15	6	40.0	11	5	45.4

Of 46 cases of small-pox treated in the Derby Borough Hospital in 1893, 14 had no marks of vaccination; 5 of these 14 died, and 3 others had the disease in a severe form. Of the remaining 32 vaccinated cases only 2 died, and these two had been vaccinated very imperfectly, one in one place only, and the other in two places. These two fatal cases were the only severe cases amongst the vaccinated.

These experiences could be multiplied indefinitely; but, if what has already been given does not carry conviction, it is to be feared that this result would not be secured by wearisome iteration. It is clear that there is vaccination and vaccination, and that the severity of an attack of small-pox is in proportion to the efficiency or otherwise of the original vaccination. Parents, ignorant but otherwise well-meaning towards their children, will always be found who first object to more than "one mark" on their child's arm, and who prefer to go to those doctors that will pander to their whim and "not hurt their babies." There are many such medical men in practice who are ready to fall in with this foolish request, on the ground that half protection will be better than none at all. But, in face of the experiences, of which a few have been referred to already, medical men will do well to refuse absolutely to perform anything but vaccination of the most efficient sort. If a firm, united stand of that kind were made against the foolish prejudices of ignorant mothers, cases of post-vaccinal small-pox would be prac-

tically abolished amongst children, and would become much more rare amongst adults. Such a result could not fail to break down utterly the opposition to vaccination.

MITIGATION OF SMALL-POX BY VACCINATION.

The influence of vaccination in mitigating the severity of an attack of small-pox is further shown in the records of the "pitting" or permanent disfigurement following the disease, and also of the length of stay of patients in hospital. Thus, in the recent Leicester outbreak we find, from Dr. Priestley's very full and precise report, that of 134 unvaccinated cases of small-pox that recovered, as many as 112 are more or less "pitted," most of them severely; whilst out of 177 vaccinated individuals who recovered, only 43 have any "pitting" whatever, and in only 4 cases is the "pitting" at all severe.

From Dr. Barry's report on the Sheffield epidemic of 1887-88 (page 190), we find that out of 451 vaccinated children under 10 years of age attacked by small-pox, only 24 showed any "pitting" on recovery, whilst Dr. Barry reports that "in nearly all the children of the unvaccinated class who were incidentally inspected in the course of the inquiry, the attack of small-pox was of a severe type, and in the majority of cases was followed by considerable 'pitting.'" The same experience has been furnished by the other epidemics of recent years.

As regards length of stay in hospital of the different cases, the experience of Leicester last year is that amongst children under 10 years of age the stay of the vaccinated was 14.5 days, and of the unvaccinated 47.3 days. Amongst persons over 10 years of age, the average stay was 28.6 days in the vaccinated, 14 days in those who had had small-pox previously, but as much as 44.2 days amongst the unvaccinated.

In Keighley the average duration of the illness was 36 days among the vaccinated, as compared with 53 days in the unvaccinated. Broadly speaking, this is the experience of every small-pox epidemic.

Again, in past times blindness has been a very common result of small-pox, but happily vaccination has produced a marked improvement in this respect.

(To be continued.)

A REPORT

ON THE POSSIBLE CONVEYANCE OF CERTAIN WATERBORNE DISEASES, ESPECIALLY TYPHOID FEVER, BY OYSTERS AND OTHER MOLLUSCS.

V.

The Frost.—The Isle of Wight Fisheries.—The Medina.—The Isle of Wight Sewage.—Sea Water and Pathogenic Organisms.

OWING to the prolonged frost and the blocking of harbours and estuaries by ice, it was necessary to suspend the inspection of various typical oyster stations which it was proposed to make in the course of this inquiry. It has, however, recently become possible to visit the Isle of Wight.

The sheltered waters of the Solent and its ramifications have, like those of the estuaries on the west of East Anglia, been from time immemorial the favourite haunts of the oyster, although in the course of centuries the surroundings and the state of the beds have been greatly influenced by the growth of population, and, in most cases, for the worse.

Until we can avail ourselves of the results of the bacteriological and chemical examination of the water and mud, we shall refrain from expressing any positive opinion as to the precise degree of danger, or the actual state of the beds, and content ourselves with a mere statement of facts which are in themselves indisputable, and of the inevitable inferences therefrom.

The geological structure of the Isle of Wight is remarkable, and, for so small an area, very varied. A ridge of chalk hills runs from east to west, the beds to the north and the south of these being respectively the more recent tertiary and the older greensands, with a few spots in which underlying wealden beds come to the surface. But while the strata in the north are horizontal, and those approaching the cliffs

on the southern shore are inclined, the chalk in the middle, with certain marly sands and argillaceous strata adjacent, is almost, or quite, vertical, as is well seen in the striped cliffs of Alum Bay.

There are only two streams that can claim to be called rivers—the Medina and the Eastern Yar; but there are several estuaries, of which, since the reclamation of Brading Harbour, the chief are the Medina and the harbours of Newtown and Yarmouth. Each of these drains a certain area, but the volume of fresh water is so much smaller than that of the salt entering with every tide that through their tidal reaches and ramifications they shrink at ebb to rivulets in an expanse of mud, swelling with the flood to considerable arms of the sea. The sudden expansion of the Medina at Newport is partly due to the accession of the Lukeley, and the waters of the two streams are easily distinguishable for some distance below their junction by their respective colours, a greenish-grey and a yellow-brown, due to the characters of the soils drained by each. The greater part of this mud is sooner or later deposited in the course of the lower river, though the stream is decidedly turbid to its very mouth.

The sewerage of the towns, some of them growing rapidly, is in a very unsatisfactory state. The sewage of Newport is discharged into the Medina immediately below its junction with the Lukeley in a perfectly crude state, and from the very feeble current in the running stream, the great volume of the tidal flow to which it is opposed, and the shallow shelving character of the channel, it is estimated that about three and a-half days elapse before the Newport sewage can reach the sea. While the tide is rising the waters from the upper reaches are held back, a condition very favourable to deposition of suspended matters. The sewage from Parkhurst barracks and prison is supposed to undergo a process of "treatment" by means of lime and iron alum, but a "sanitary authority" that does not even make a pretence of treating its own sewage cannot be expected to exercise any very strict check on the action of another body.

The whole of the sewage from East Cowes is discharged in a crude state well within the harbour, the mouth of the sewer being protected by a penstock. From West Cowes, also, a number of small drains open into the river, though there is a so-called "main sewer," the outfall of which is at Egypt, about a mile to the west of the river's mouth. That the sewage from East Cowes ascends the Medina with the rising tide appears to be generally admitted, and considering the strength of the eastward current in the Solent at such times, it would be very unsafe to assert that some from Egypt does not follow it. The harbour is also at certain seasons crowded with yachts and with small craft engaged in the coasting traffic, but it is not likely that any cases of enteric fever would be knowingly retained on board. It appears, therefore, to be the case that the entire sewage of Newport passes in a crude state into the Medina, within three miles of the oyster beds, and that it is in no part of its course subjected to the purifying action of a large volume of fresh running water, but oscillates with the ebb and flow for three or four days; and that much of the Cowes sewage also is probably carried up the river with every rising tide.

Under any circumstances this would be bad enough, and the condition of the Medina has frequently been the subject of complaint and of inquiries, but owing to the general badness of the water supplies, public and private, alike derived from dry-stained wells sunk in a chalk riddled with fissures and pervious cesspits, enteric fever is endemic in Newport and its neighbourhood. Notification has only recently been adopted, but the number of cases notified last year in the Urban Sanitary District alone having a population of, perhaps, 10,500 (at the last census 10,216) was no less than 389, the actual number being, it is believed, considerably over 400. The whole of their excreta must, according to the data given above, have floated in the river for three or four days. Cholera too has been extremely severe and fatal whenever it has reached Newport.

The oyster fisheries in and around the island have fallen off greatly of late years. The once famous Solent native is almost displaced by a very similar French variety, which is imported from Arcachon and laid down in the beds in the Medina, together with Portuguese and other decidedly marine