

other hand his interrogator meant dead organic matter, he replied Mr. Folkard. that germs were no more amenable to the laws of dead organic matter than a living man was. Again, every biologist was aware that the lower the organism the more persistent was its vitality, as a rule, and therefore a living germ was at the very least quite as capable of resisting oxidation during a 10 or 100, or 1,000 miles swim down a river (water being its appropriate medium) as was a hen's egg for an equal time or during transport through an equal distance in its appropriate medium, the atmosphere; and he thought few people would doubt the capacity of a hen's egg to germinate after such an interval and such treatment. Under the circumstances he could leave the members of the Institution to decide which of two chemists was the more likely to gain respect, the one who, after ten years' experience in water analysis, had come to the conclusion that the present methods were unreliable, and was willing to own it; or on the other hand, the one who tried to throw a halo of importance round a process admitted by nine-tenths of the analysts of the present day to be worthless, by stating that he had analysed nearly four thousand samples by it. It would be equally logical to say that hanging for sheep-stealing was a good law because it had (unfortunately) been carried out hundreds of times in this country. In conclusion he must thank the members for the kind way in which they had listened to the Paper and to his remarks, and if it should be the means of directing still further attention to this important subject he should be extremely gratified.

Correspondence.

Mr. H. PERCY BOULNOIS said that the Water Works of the City Mr. Boulnois. of Exeter, of which he had charge, were the property of the Corporation. The daily supply, amounting to 1,280,000 gallons, was pumped from the river Exe, the intake being situated about 4 miles above Exeter and 12 miles below the town of Tiverton, the sewage of some ten thousand persons at this place being daily passed direct into the river in a crude state.

To ascertain how far this sewage contamination chemically affected the water, he took samples from different points in the river in August 1880, and submitted them to Mr. F. P. Perkins, the public analyst of the City of Exeter, who examined them by the permanganate process and a modification of Professor Ditt-

Mr. Boulnois. mar's carbon process. The following Table embodied the results of these tests :—

SPECIMENS of WATER TAKEN by Mr. BOULNOIS from the RIVER EXE on AUGUST 16th, 1880, and SUBMITTED to Mr. PERKINS for ANALYSIS.

Number of Specimen.	Where Obtained.	Distance below Tiverton.	Amount of Organic Impurity in 100,000 parts.	
			Oxygen consumed $\times \frac{c}{o} =$	Organic Carbon yielded.
1	Above Tiverton . .	1 mile above .	$\cdot 0718 \times 2 \cdot 27 =$	$\cdot 163$
2	Below Tiverton . .	100 yards below	$\cdot 0873 \times 2 \cdot 81 =$	$\cdot 246$
3	Ditto	2 miles „	$\cdot 0929 \times 2 \cdot 93 =$	$\cdot 273$
4	Bickleigh Bridge . .	3 „ „	$\cdot 0788 \times 2 \cdot 41 =$	$\cdot 190$
5	{ In a stream joining the } Exe called the Dart }	3½ „ „	$\cdot 2070 \times 2 \cdot 11 =$	$\cdot 436$
6	{ Below Bickleigh mill } stream }	3½ „ „	$\cdot 0859 \times 3 \cdot 16 =$	$\cdot 272$
7	Bourne Farm	5 „ „	$\cdot 080 \times 2 \cdot 70 =$	$\cdot 218$
8	{ Thornetown above the } weir }	8 „ „	$\cdot 0831 \times 2 \cdot 60 =$	$\cdot 218$
9	At intake	12 „ „	$\cdot 0715 \times 2 \cdot 29 =$	$\cdot 164$

It would be noted, on reference to this Table, that the water at the intake was chemically nearly similar to that above Tiverton, and that this result was obtained gradually by the water on its journey. The Dart stream, however, seemed to pollute the water, there being a marked difference between samples 4 and 6; this was accounted for by the fact that the Dart rose on Exmoor, and although it could receive absolutely no sewage contamination, it was brown with peat, and this gave a bad analysis.

So far as Exeter was concerned, it was contended that the water at the intake was not unhealthily affected by the sewage contamination of Tiverton, and this result might be attributed to the following causes :—(1) The excessive dilution of the sewage with a large bulk of pure water. (2) The oxidation which the water underwent on its 12 miles journey from Tiverton, tumbling as it did over two weirs and rushing over many a shallow and stony bed. (3) The action upon the water by aquatic plants and weeds, and of the soil of the river banks and bed. (4) The constant evaporation from the surface of the water, and consequent molecular changes thus altering its character. (5) Other unknown causes possibly at work which made up the ever active processes of Nature's great laboratory.

The Author questioned the reliability of chemical analysis to detect "previous sewage contamination," but he did not appear to

have given credit to the fact that, in a properly conducted analysis, Mr. Boulnois. no chemist relied upon one indication only, but that all the bearings of the analysis and history of the water were considered. If the analysts' evidence was to be doubted, much difficulty would be experienced by sanitary authorities in closing polluted wells or other impure sources of water supply; but hitherto reliance had always been placed upon such evidence, and he thought no sufficient proof had been adduced in the Paper to shake public confidence. The question was one of grave importance, the health of a community being no doubt greatly affected by the character of its water-supply; no hasty conclusion should therefore be arrived at in favour of deep well-water. It might be that the terrible "diseases of the stomach and intestines" mentioned in the Paper were due to contaminations in shallow well-waters, or to the mineral substances found in most deep well-waters, and not from that source which Nature pointed out as the most convenient and proper from which to derive the water-supply.

Mr. EDWIN CHADWICK, C.B., observed that there were particles Mr. Chadwick. from small-pox and other eruptive diseases, which were known to be distributed in hospitals within measurable distances. But these were imagined, but not proved, to be germs of specific diseases which spread to immeasurable distances, and which it was averred must be productive of the same diseases. These germs were alleged to be the cause of enteric fever, and when conveyed by water-carriage must generate it. A disease did arise sometimes, with varying type, from the emanations from stagnant drains or sewers. But he never heard of any arising in such conditions along lines of sewer in accordance with the germ theory. In an address given at Croydon to the members of the International Medical Congress by Dr. Alfred Carpenter, adducing experiences in answer to the violent objections that had been made by the advocates of chemical disinfectants, and other processes against sewage farms, on the grounds that they must receive and must spread the germs of infectious disease. Dr. Carpenter stated the result of his experience, to which he would direct particular attention: it was as follows:—

"The non-infectious character of the excretions of those suffering from epidemic and infectious diseases when distributed upon a sewage-farm is proved by the fact that there have been occasional outbreaks of infectious diseases in Croydon during the past ten years, including two epidemics of small-pox, several outbreaks of scarlet fever, occasional cases of diphtheria, and three periods of typhoid prevalence—two of which were distinctly connected with contamination of water-supply in its distribution, and a third was distributed by means of milk. In the years 1875-76 the excreta of at least a thousand cases of enteric fever were

Mr. Chadwick. utilised on the farm. In the majority of the cases the excreta were certainly not disinfected, and had they been capable of setting up the disease, some of the sixty-five persons at that time in the employ of the Local Board must have suffered from the infection. Cases which did arise were not on the farm, or even in the majority of cases, near to it; they were on the hills, beyond the range even of subsoil water. The changes in sewage are not in any way similar to those which have been known to take place in poudrette and other particular forms of dried ordure. There is no doubt in my mind of the destruction upon sewage farms of the germs of mischief, which, when unaltered, may be capable of setting up zymotic disease. They are not preserved as they may be in dried ordure, or in other products in which so-called disinfectants have been used, which have simply preserved the germs from decay; but they are chemically and physically altered so that mischief cannot arise. This result has been also found to apply to the excreta of animals suffering from epizotic disease. During the past few years there have been several outbreaks of infectious pleuropneumonia in the Croydon district, the infection being brought from the Metropolitan Meat Markets. The cowsheds in which the disease has arisen have drained into the Croydon sewers, and blood and excreta from the slaughtered animals have been washed down those sewers. The sewers have carried the morbid matter from the sheds to the farm; but there has been no corresponding disease among the cattle upon the farm."

To this he might add that similar demonstrations were presented by all well worked sewage-farms. Moreover, insects generated and distributed in solid manures, and in stagnant semi-liquefied manures, were drowned by liquid manures in active circulation. It must follow that from continued exposure to such germs as those assumed that the health of those working on the sewage farms must be lower than the average, whereas it has been shown in a report to the Royal Agricultural Society that the health of the people working and living on the sewage farms was remarkably higher than the average.

Mr. De Rance. Mr. C. E. DE RANCE remarked that the Author, by grouping a series of well-known facts in a definite connection, had done useful work, in establishing the unassailable result, that the practical freedom of drinking water from organic impurity must be absolute to prevent the spread of zymotic disease. How this desirable condition was to be obtained was a difficult problem. Gravitation supplies, derived even from the mountain slopes of Wales and the English Lake District, traversed only by mountain sheep, occasional tourists, shepherds and their dogs, were liable to receive the germs of entozoa, especially from the latter; while water supplies abstracted from rivers, even when all town sewerage was intercepted, received streams flowing past polluted farm yards, and the soakage from the offensive ditches with choked outlets, which so often surrounded them. In a gravitation supply absolute freedom must of necessity be impossible, but much could be

effected, by making the separation of sewerage and storm-water Mr. De Rance. compulsory, not only in the drainage from cities and towns, but in the effluent water from country estates.

In water obtained from underground sources, whether from deep-seated springs, or wells, the chances of poisonous germs being left was very small, after the passage of the water through several hundred feet of porous rocks, provided that the water had passed through the texture of the rock, but in many cases, the water had simply travelled, both vertically and horizontally through open fissures formed by joints and faults, and this was probably the condition of many wells giving an exceptionally large daily yield of water, which had not been naturally filtered. In some other cases, deep bore holes had been sunk entirely in porous rock, in which every care was taken to exclude, and tube out, surface waters, but the water yielded was found to be polluted, percolation having taken place through cracks and fissures, connecting the surface with the saturated portion of the rock beneath. Of necessity wells reaching porous formations after passing through a zone of impermeable material were not open to this objection, and the chances of pollution were exceedingly small in the water yielded by them and by deep-seated springs. To increase the yield of these springs appeared to be a matter of the highest importance, for should the construction of "dumb wells" become general, and the drainage of impermeable lands be artificially carried to porous strata beneath, whenever practicable, the supply of pure drinking-water would not only be increased, but the absorption of excessive rainfalls would diminish the intensity of floods, and improve the dry-weather volume of the streams.

Mr. H. U. McKie knew one town in Wales which took its water- Mr. McKie. supply from a river, when about 1 mile of extra piping would have given good spring-water. Villagers near the river from which the water was taken would not use it, yet chemists pronounced it pure. He had recently had occasion to examine some works by a river side, and saw what he thought to be two sticks floating down the rippled surface of the stream; they appeared to be attached together by a string, and made curious bobbing motions, similar to a float on a fishing-rod when there was a nibble at the bait; on closer examination he found it was a large salmon so covered with a fungoid growth as to be both pitiable and revolting, and he was told that the river was full of salmon thus affected. Now, as this disease also attacked trout, eels, and other fish, in the river, he thought it right to ask if water so contaminated could be a safe source of potable water-supply for a town? He knew of two

Mr McKie. towns on this river which derived their water-supply from it, and there might be others.

Mr. Robinson. Mr. H. ROBINSON could not agree with the Author in his sweeping condemnation of the use of river-water unless taken near the source. However desirable it might be to obtain water free from the risk of contamination (and every engineer aimed at securing such a supply) in practice it would be impossible to meet the wants of the community, if the rule laid down were acted on. The enforcement of this rule would necessitate the abandonment of numerous sources of supply which failed to comply with these conditions, but which, although subject to the risks referred to, had not produced any evil results. Probably the Author, by enforcing an unreasonably high standard of purity, would create some of the evils which it was sought to prevent. If only water from deep subterranean sources or from streams above suspicion of contamination were to be used, a less abundant supply would be available than was now employed. The limitation of supply would arise from two causes, one being the difficulty of obtaining the necessary quantity of underground water, and the other being the cost of getting it. Where the cost of supplying a town was attended with heavy water-rates, Mr. Robinson had found that the authorities were disposed to restrict the quantity used for sanitary purposes, such as flushing sewers, road watering, and the like. Such restriction would lead to insanitary results. The alarmist views entertained by the Author were not supported by practical evidence. If the germs of contagious diseases had the vitality and produced the mischief alleged, the evils attending the use of water subject to their influence would have been manifested. Without wishing to underestimate the risk of transmitting diseases by water, Mr. Robinson would expect to find some proof of the allegation in the case of a city like London. Obviously the water supplied by the metropolitan companies which took their supply from the Thames must be placed in the class of water of the dangerous kind; no contagious diseases however could be traced to its use. Frequent attempts had been made to connect cases of typhoid and similar diseases to the use of water supplied from the Thames, and he had on several occasions been engaged in examining into such cases. He had found (and the experience of others was to the same effect) that where water had caused illness it had been solely through the foul state of the cisterns and receptacles for storing it. The presence of filth of various kinds and dead animals accounted for the mischief. A constant supply would remove this cause of danger.

Another view of the subject was worth referring to. Supposing Mr. Robinson. water perfectly free from suspicion was to be insisted on for dietetic purposes, a duplicate supply would be required in many cases, such as has been proposed for London. Were this system to be adopted the inferior water would most probably be less pure than that previously supplied, inasmuch as it would be thought unnecessary to filter water intended to extinguish fires, water streets, or cleanse courts and alleys. The germs of some contagious diseases were, according to the best medical authorities, even more capable of being introduced into the human system through the lungs than through the stomach. If, therefore, the dangers apprehended were really based upon reasonable grounds, the air instead of the water might become the medium for conveying the disease germs under the state of things that would then exist. Much inconvenience had been experienced by engineers, owing to analytical chemists adopting different terms to express the results of their analyses. Mr. Robinson was continually having to deal with analyses in which similar impurities were described by different chemists in different terms. The adoption of a uniform nomenclature would be both convenient to those who had to act upon the results of chemical analyses, and would also remove one of the several grounds of difference that appeared to exist amongst chemists themselves.

Mr. JOHN TAYLOR observed that the Lambeth Water Company Mr. Taylor. had opposed the establishment of the Lower Thames Valley Joint Sewerage Board's proposed sewage farm at Molesey, on the ground that the source of their supply of underground water would be polluted, in consequence of the immense volume of sewage intended to be put on the land. It was contended on behalf of the Joint Board that this underground water was nothing but "Thames river water filtered through a stratum of porous gravel." Samples were obtained from Abyssinian pumps sunk on various parts of the proposed sewage farm. The whole question was investigated by Mr. J. T. Harrison, M. Inst. C.E., and Captain Hildyard, R.E., who were appointed by the Local Government Board, and whose inquiry lasted forty-five days, and who both agreed in a report from which he would quote.

The importance of this report would warrant the length of the quotations. In the letter from the Secretary to the Local Government Board to the Clerk to the Lower Thames Valley Main Sewerage Board, dated the 8th of November, 1880, intimating that "the Board in discharge of their public duty feel themselves unable to grant the Provisional Order applied for," it was stated :

Mr. Taylor. "The question whether the Lambeth water-supply would be affected by the sewage is one of considerable importance and no less difficulty, the evidence upon this point being very conflicting. It will be seen that the inspector is distinctly of opinion that, when the pumps are at work, the subsoil water does travel from the direction of the proposed farm towards the intake of the Lambeth Company, and evidence was adduced to show that wells were affected by the pumping at the Lambeth works, and that some of them were within a quarter of a mile of the farm. At the inquiry the Joint Board offered to construct a puddle-wall to prevent any flow of water from the farm towards the Lambeth wells; but this wall would only extend along the west and part of the north sides of the farm, and probably could not be relied upon in case of floods.

"It is at least doubtful, therefore, whether the irrigation with a large quantity of sewage of so extensive an area of land so situate would not affect the particular source of water-supply referred to, and the Board would incur very grave responsibility if they sanctioned a scheme which might prejudicially affect the water-supply of any part of the Metropolis."

In the Report to the President of the Local Government Board on the petition from the Lower Thames Valley Main Sewerage Board, dated the 21st of May, 1880, Mr. Harrison had stated:

"The objections of the Lambeth and other Water companies demand serious attention. The contention of the Lambeth Water Company is that they are empowered under their Act of 1848 to draw water from the Thames at Thames Ditton, and that by their Act of 1871 they have power to draw water from the subsoil of their property at West Molesey, as well as from the Thames at the same place; further that they may have occasion to draw water from the Thames at Ditton, and that they actually draw largely from the subsoil at Molesey, that the source of supply in each of these cases would be polluted by the establishment of the proposed sewage-farm, and that to avoid such pollution the Joint Board should not be permitted to bring the sewage of the district on to the proposed land.

"To show that the Joint Board considered this contention was not frivolous, it is sufficient to state that they proposed to insert a clause in the Bill presented to Parliament in 1879 requiring the water company compulsorily to close their intakes below the confluence of the rivers Mole and Embur with the Thames, and at the inquiry they expressed their willingness to construct a drain,

at a cost of £25,000, from the sewage-farm to a point below Mr. Taylor. Thames Ditton, if, in my opinion, it was desirable to do so. They also proposed to construct a puddle-wall for a length of about 3,000 feet along the western and northern sides of the proposed farm, at a considerable cost (variously estimated at from £5,800 to £10,000), with the express object of preventing the water from the farm flowing underground to the intakes of the Lambeth Water Company. It is true that both Colonel Haywood, who designed the scheme, and Sir Thomas Nelson are of opinion that the construction of this puddle-wall is unnecessary, and they deny the assertion that the Lambeth Company draw any water from the subsoil; but I have no doubt as to the fact that they do draw very largely from the subsoil source, and it is difficult to suppose that this source would not be prejudiced by the proposed sewage-farm. I do not believe that the puddle-wall would protect the water company against the pollution of their underground source of supply, more especially during floods and in very wet weather, when they draw most largely from this source.

“In my opinion the interests involved in this question of subsoil water-supply are of much greater importance than they would be if they affected only the Lambeth Water Company and those inhabitants of London to whom they supply water.

“The Lambeth Water Company laid down perforated pipes parallel to the River Thames along the frontage of their premises, evidently with the expectation that they would thereby take advantage of the natural filter formed by the gravel and sandbeds intervening between the Thames and their pipes, and would thus obtain a supply of Thames water naturally filtered, and would thereby diminish materially the expense and difficulty of filtering the water sufficiently for delivery in London. The result is that they have for some years drawn about 10,000,000 gallons per day from this source, the remaining 6,000,000 gallons daily supply being taken directly from the Thames. The water thus derived from the subsoil is beautifully clear, and the advantage of having this source of supply during floods is very great, at the same time the analyses of the water supplied by the Company for several years past prove that its quality has been improved.

“The Joint Board and the Lambeth Company have taken a great deal of trouble during the inquiry to ascertain the source whence this subsoil supply was derived, and after giving all the ascertained facts great consideration, I am of opinion that probably more than half of the supply is derived from the land and less than one-half from the Thames.

Mr. Taylor. "If this be so, I need only mention the reply given by Dr. Frankland to the following question :

"*Question.*—Assuming that the sewage of 330,000 people is to be put on this area of land, and that the Lambeth Company are pumping within a mile . . . do you consider that there would be risk of infection by the fact of that water being afterwards drunk?

"*Answer.*—Undoubtedly; and if I had found that the subsoil water could by any possibility have been pumped then, I should not have been here to-day to advocate the scheme (of the Joint Board).

"Dr. Frankland was a witness for the Joint Board.

"It is true that, after further investigations and analyses taken by him, Dr. Tidy, and Dr. Voelcker, he came to the conclusion (*vide* joint report) that :

"Without saying that no subsoil water whatsoever finds its way to the pumping station of the Lambeth Company, it is evident, for all practical purposes, that the water pumped by the Company is nothing else than Thames river-water, filtered through a stratum of porous gravel."

"This conclusion was based upon a comparison between the average analyses of the Thames and well-water and of samples taken from the subsoil at the farm. The mistake of thus considering the question was clearly shown in the examination of Dr. Tidy, who presented the report; and a comparison between the average analyses of the Thames water and of that taken from the farm, and the analyses of the well-water proved clearly to my mind that at least one-half of the well-water pumped by the Lambeth Company is from the land. Mr. Michael, in his reply, admitted that Dr. Tidy's evidence proved 'that the water which was in the well could not come entirely from the Thames without any other source.' At the same time he denied that it comes from the direction of the farm. I have carefully considered the question, and I am satisfied that the subsoil water does travel from the direction of the sewage-farm to the Lambeth intake.

"I cannot pass without notice the question of whether it is not very desirable that this subsoil source of water should be largely taken advantage of for the supply of London.

"The quality of the water is of first importance—upon this question the chemists differ widely—

"Dr. Frankland says, 'I should rather prefer the Abyssinian pump water (taken on the sewage-farm) to the Thames water, either taken directly from the Thames or from

the pumping well of the Lambeth Company for domestic Mr. Taylor. purposes,' 'on the ground that it contains, on the whole, a smaller proportion of organic matter; it is not much harder, and there is no excessive quantity of solid matter in it;' again—'If the Lambeth Company could get water of the quality that we obtained from these Abyssinian pumps it would certainly be an advantage to supply that water to London in preference to Thames water.'

"On the other hand, Dr. Tidy says, 'I should object to subsoil water being used for the supply of London,' and he could not agree with Dr. Frankland in the above opinions, as he considered one sample of water had 'a certain shadow of suspicion that would make him hesitate to speak so confidently of that water as Dr. Frankland did;' again, Professor Wanklyn says, 'The water (from the Abyssinian pump on the farm) was remarkably pure; it was the purest water next to deep spring-water that I ever met with.'

"If this subsoil water be as pure as Professor Wanklyn and Dr. Frankland represent it, and a source of supply for London preferable to the river Thames, it becomes a matter of very great importance to ascertain the gathering ground from which this supply is derived, the probabilities of its being polluted, and the quantity of water which may be derived from it.

"At the commencement of the late inquiry a geological map of the country to the westward of the sewage-farm was prepared at my request. This plan showed the outcrop of the London Clay between Richmond and Ealing on the east, and the neighbourhood of the Winchfield Station on the west. The London Clay seems here to form a complete basin, within which lie deposited the Bagshot sands to the westward and Thames gravel to the eastward. The area of the basin thus covered is 200,000 acres, and it may be described generally as formed of exceedingly permeable materials, such that the rain rapidly disappears from the surface. The basin is traversed by the Blackwater, the Wey, and the Mole from south to north, and by the Thames flowing from west to east. I am not certain, but it appears probable that the former rivers carry off but little of the rain falling within the basin. The map above referred to was submitted to the late Professor Ansted, and he gave it as his opinion that the Bagshot sand formation is the gathering ground for the underground river at Molesey. The population on the Bagshot sand formation is very sparse, and the area, taken as a whole, is not liable to serious pollution. Ten

Mr. Taylor. inches of rain sinking into the ground over the entire area would probably yield annually a larger volume of water than is at the present time delivered to London by all the water companies who take water from the river Thames.

"The views above expressed are given as approximations only to the truth, but they are of sufficient importance to justify further careful investigation into their accuracy; and if they are correct every means should be taken to prevent the pollution of this valuable subsoil water.

"Dr. Tidy and others have expressed strong objections to the use of subsoil water for the supply of London. I do not admit the validity of their objections; were this water contained in a basin of gravel, with numerous sources of pollution on the surface, and the water itself stagnant, I should heartily concur in them, but it is not thus in this instance. The area of gathering ground is very extensive, remarkably free from pollution, and the water is constantly flowing through underground channels of sand and gravel to the lowest part of the basin, viz., the neighbourhood of Thames Ditton, where the issue, at one time, of water above the level of the river has apparently given the name 'Seething Wells' to a spot near the Thames."

Other statements had been made by Mr. Jabez Hogg as to the Lambeth Company. For instance, he said: "It had apparently not entered into the calculation of any one, that in drawing subsoil-water from an area of some extent (in this instance a radius of more than $1\frac{1}{2}$ mile) the whole incidence of that area must be taken into account. Now, it so happened that at West Molesey it included seven hundred and seventy cesspools, all of which were pumped dry, and mixed in with the Company's water. A Government investigation ended in putting a stop to that objectionable mode of drawing a supply of 'spring-water'" (p. 93). On this Mr. Taylor might remark that the preceding quotations from the Government Inspector's report showed that not only was the drawing of this spring-water not put a stop to, but that it was considered by him a most valuable and pure source of water-supply.

Moreover, the statement of the number of cesspools was erroneous. He had the number of cesspools carefully counted, and ascertained that within a radius of $\frac{1}{2}$ mile from the pumping engine there were only nine, and within a radius of 1 mile only thirty-nine, making a total within a mile of forty-eight, while the whole number of houses in West Molesey was not more than eighty. If with West Molesey Mr. Hogg meant to include East Molesey, which lay at a

distance of 2 miles and upwards from the pumping station, it **Mr. Taylor.** was doubtful whether there were in both places half the number of cesspools which he had stated. But even if there were, it had been conclusively shown during the inquiry that the subsoil drainage flowed towards the north-east, or towards Molesey lock, where there was a fall in the river level of 6 feet. This flow was directly away from the pumping station, and the fact had been commented on in one of the above quotations from the Inspector's report.

31 January, 1882.

JAMES BRUNLEES, F.R.S.E., Vice-President,
in the Chair.

The discussion upon the Paper by Mr. Folkard, on "The Analysis of Potable Water," occupied the evening.
