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Yours faithfully,

H. Percy Boulnois

1920.

Photo: Elliott & Fry.
REMINISCENCES OF A MUNICIPAL ENGINEER

BY

H. PERCY BOULNOIS,
M.Inst.C.E.

LONDON
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TO HER, TO WHOM I OWE ALL MY HAPPINESS AND ANY SUCCESS THAT I MAY HAVE ACHIEVED IN LIFE, TO MY DEAR WIFE,
I DEDICATE THIS BOOK
One of my objects in writing this book was to give to the general public some better conception than they would seem to have at present of the work which devolves on a municipal engineer. Incidentally, its contents may show that such an official can take an interest in literature and in other subjects outside the scope of his daily duties. I am not aware that any other engineer has ever been sufficiently venturesome to write his life, and in this respect, I believe, the book is unique. My aim has been to make these reminiscences not only interesting but amusing, and as to how far I have been successful in this I must leave my readers to decide. "Nil sine labore."

H. P. B.
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REMINISCENCES OF A MUNICIPAL ENGINEER

CHAPTER I

EARLY MEMORIES

A FRIEND of mine, an engineer, told me that on his 21st birthday, his father, to whom he had been articled, took him into partnership. A few months later his father died, and, as is usual with engineers, there were one or two unsettled legal actions pending in which his father had been engaged as an expert witness. My friend had to give this evidence, and in his first case, under cross-examination he repeatedly said, "I was told this," "I am told that," until Counsel reproved him and said, "You must not say what you have been told, but what you know." At last the Judge intervened and said, "Mr. Blank, you must not say what you were told, but what you know as a fact." A little later, Counsel getting somewhat angry, said rather sharply, "How old are you, Mr. Blank?" Whereupon my friend replied, "I don't know." "Don't know your age, sir, what do you mean?" My friend promptly replied, "I am told I am twenty-one," and the laughter in Court smoothed matters over for the rest of his cross-examination.

Thus I, in commencing these reminiscences, cannot say from memory of the occasion that I was born on January 15, 1846, but merely that I have been told so. There is, however, some documentary evidence of the fact contained in the certificate of my birth, a copy of which is in my possession, and also a reference to the event in The Times of January 19, 1846, which is as follows:

"On the 15th inst., the Lady of William Boulnois, Esquire, Abbey Road, St. John's Wood, of a son."

This was the stilted language of those days, and I must conclude that the announcement referred to me and to no one else. I have been told that my appearance took place at a very early hour of an extremely cold day—which may account for my having always
been a fairly early riser, and my extreme dislike of cold weather.¹

The one fact connected with my birth for which I can vouch is, that I must have been born at 47, Abbey Road, for I lived there until I was about 8 years old, and being of an observant nature, I was able to take some notice of my surroundings. The number of the house is now, I think, altered to 22, and a large portion of what was then garden has since been built over. The house was almost opposite a fine avenue of elm trees, which was reputed to have formed a part of the old St. John's Abbey, from which the road derived its name. In my time there were tea gardens at the end of the avenue and no traces of any Abbey.

We had a large garden, kitchen garden, stables, and it was almost a "country house" in those days. I know we kept pigs, for my very earliest recollection is connected with a small pig on which I had lavished my childish affection. It had been named Peccary, but the day came when it had to be sacrificed and, unknown to me, negotiations had been entered into with a butcher to abduct Peccary in a cart during my temporary absence with my nurse on a constitutional walk. Unfortunately for the plot, the butcher was late, and I returned in the nick of time to see my beloved Peccary squealing in the arms of his abductor. A terrible scene followed; I fell on the butcher with cries and kicks, my screams attracted the neighbourhood and I was only pacified by one of my older brothers gravely informing me that the Queen (Victoria of ever-blessed memory) had taken a fancy to Peccary, and that he was going then and there to Buckingham Palace, where he would sleep in a feather bed and eat his meals off plates of gold. To this day I almost believe that this is the true story of Peccary, and whenever I pass Buckingham Palace I feel inclined to call and ask how he is getting on! One thing comforts me about this tragedy, and that is, that I was too young to be allowed to eat either pork or sausages, and my conscience is thus clear.

So much for this episode of blighted affection; my next recollection is one of scientific investigation and disillusion. There were several culs de sac and unfinished roads in our neighbourhood, and whether I had been told it, or imagined it for myself, I know not, but for a long time I had the impression, amounting almost to a firm belief, that if I could only climb up on to the wall or hoarding

¹ There was only one other announcement of a "distinguished" birth and that was as follows: "On the 17th inst., in Albemarle St., the Lady of Frederick Hennessy, Esquire, of Cognac, of a son." This boy was evidently born under three lucky stars!
at the end of these roads I should see the edge of the world going shear down into space. One day I must have evaded my nurse, and managed to climb on to a hoarding or wall—when, judge my disappointment; all I saw was a piece of waste ground and a cat sunning herself thereon.

Looking back on this incident, I cannot help thinking that all children, even now, are more or less imbued with the idea that the world is flat, and there is very little to guide them in thinking otherwise. We are still told that the sun rises and sets, whereas it does nothing of the kind. Children should be taught as early as possible that the sun never moves but that the earth does, and that instead of saying, sun rises at such and such an hour, the almanacks should state the fact—sun visible at such an hour, and invisible at such an hour.

Children are even now taught geography from flat maps instead of globes; and could anything be more misleading than the little hymn commencing:

"I saw the glorious sun arise,
On yonder mountain grey,
And as it travelled through the skies,
The darkness fled away."

which I was taught to repeat as part of my morning prayers. 1

My discovery that I could not see the edge of the world, after my heroic exploit in climbing the wall, was somewhat of a shock, but none the less a relief to my mind, as I had hitherto been troubled with some misgivings as to what would have happened to me if I had accidentally tumbled off the edge!

My next recollection is historical, as I was present at the Duke of Wellington's funeral. I sat with adults by the coping of a roof of a house at the bottom of Waterloo Place, and from that exalted position I gazed upon a procession which I believe took hours to pass along Pall Mall. I have a dim recollection of the huge hearse and the Duke's charger led by a groom and the late Duke's black jack boots hanging in the stirrups with the toes reversed, but I

1 Somewhat later in life I was taken to see "Wyld's Globe," which occupied the whole of the site which is now the public garden in Leicester Square. This globe, or representation of the world, was contained in a huge wooden building, and on payment of a small fee you entered the interior of the world painted on canvas, with the mountains and contours moulded to scale, but of course reversed as they pointed towards you. This I remember gave me the first impression of the gigantic size of the world, and the fact that it was really a globe and not flat, and it is to be regretted that something of the same kind is not on exhibition to-day.
have a clear recollection of the flavour of the sweet biscuits with which I was fed during the intervals of the pageant.

It is curious how the sensations of taste, or of smell, will stimulate memory and recall past events. For instance, the only thing that I can remember about the Great Exhibition in Hyde Park in 1851, to which I was taken, is the smell that greeted me on entering the building, which was diffused from a large scent fountain erected, I believe, by Rimmel; and even now when, in passing a scent shop, I get a whiff of a particular scent, my mind at once reverts to the Exhibition of 1851. So also can I well recall the peculiar taste of the bath-buns at the Polytechnic, which were flavoured with the chemical atmosphere pervading that boy's paradise of working models, diving bells, electrical appliances, and other mechanical toys, so dear to the heart of the young enthusiast.

One of my earliest recollections, however, is one of fear. There were no night-lights in those days, and we had to be contented with what were known as farthing rush-lights, placed for safety at the bottom of a specially constructed tin bucket with holes at the sides to admit the air. These holes caused curious round patches of light on the walls and ceiling of the otherwise darkened room, which, as I lay in my cot, seemed to glare at me like the eyes of a giant. To make matters worse, my nurse had a habit of snoring in a deep bass key, and I somehow or other associated those great staring eyes and her snoring with some great monster that was waiting to pounce on me. Of course I knew better, but I think I must have preferred to frighten myself as there was a spice of unholy excitement about it. I believe most children purposely imagine things for the sake of the excitement of fear, that is if they are blessed, or shall I say cursed, with an imaginative mind.

I know that I used to do this, for I can remember on one occasion lying in a four-post bedstead in broad daylight, and three or four flies kept darting out and in from behind the curtain which was close to my face. I knew they were flies, but I purposely imagined them to be the tongue of a large snake waiting behind the curtain to spring on me, and I worked myself up into a perfect frenzy of fear before pushing the curtain back and thus dispelling the illusion.

There is a big psychological problem involved in the questions of fear and courage and how far the latter is sometimes due to lack of imagination. There is more than half a truth in the saying that "fools rush in where angels fear to tread."

London in the Fifties.—London was vocally noisy in my young days, whereas now it is mechanically clangorous. The
street cries, now prohibited, were some of them quite musical, and nearly all of them were in a minor key. The dustmen went their rounds with a lumbering cart and horse, they rang a big bell, and shouted, "Dust Oh!" with a prolonged O—h which sounded like a dirge.¹

The milkmen in white smocks carried the pails of milk suspended from a yoke on their shoulders and cried "Mee-oh," in a high staccato musical voice. The sweep and his tiny "mate," alternately cried "Sw—eep," prolonging the word in such a mournful manner that it sounded like the cry of a banshee. The muffin man, on the contrary, tinkled a merry little bell without cessation, and gave a cheerful cry of "Muffins and crumpets," with a strong emphasis on the "crump." The song of the buy-a-broom women, "One for the lady, and one for the baby," was extremely pretty, and even the old Jew clothes-man, with his bulging black bag, and his guttural tone, at nearly every step, of "Old Clo," "Old Clo," was almost dignified in its solemnity. There were many other cries and songs which made London very attractive, and which were certainly more pleasant to hear than the hoot of the motors, the sharp ting of the bicycle bell, the grinding noise of speed changing, the rattle of chain gearing, and all the noises inseparable from moving machinery. Even the Cockney accent was more attractive than it is to-day, or should I say "to die." ²

Nothing could be more ugly than this mutilation of English, which makes it sometimes almost impossible to understand what the speaker means. I had a case of the kind when I took a taxicab to my house in Mayfair. The driver had some difficulty in finding it, and when I paid him he said, "My fire is a reglar mize." It only dawned on me later that what he wished to convey to me was that "Mayfair is a regular maze," a perfectly true statement. In my childhood days the Cockney language was that given by Dickens in *Pickwick*; the W was always pronounced like a V. The following well known conversation between a Cockney gentleman and his servant is a good example:—

"Villiam, vare's my vig?"

"Vitch vig, sir?"

"Vy the vite vig, the vun I vore last Wednesday week, ven I went to Vestminster."

¹ It is rather remarkable that whereas the temporary storage of house refuse, and its final disposal, have greatly improved since those days, the methods of collection in cumbersome open carts have made but little progress.

² A cockney doctor approaching the bedside of a newly-arrived patient in a hospital said, "Did you come in to die, my man." "No," was the reply, "I came in to jolly well live if I can."
When I was about eight years old my father took my mother, two of my sisters, a brother and myself abroad, my nurse accompanying us. As this nurse lived with the family till I was twenty-three years old, I have a very distinct recollection of her personality. The only book she ever read was the Bible, but only with considerable difficulty, and it took her about a fortnight to write a letter. She was before the days of board schools, and she would now be called "uneducated" but her courteous manners and inherent gentleness would "give points" to many a lady of the present time.

I can remember very few incidents of our six months' stay abroad, except one which is of somewhat special historical interest. We were staying for a short time at the Hotel Frascati, Havre, and a young French artiste was engaged by my father to execute the portraits of my brother and myself in crayons. She did so, and was then anxious to obtain the patronage of Prince Jerome Buonaparte (the brother of the great Napoleon Buonaparte), who was also staying at the hotel. The prince was shown the portraits, and on expressing a desire to see one of the originals, I was selected to go before him. I well remember sitting on his knee and his feeding me with chocolates. It is curious to think that I, who am writing this in the year 1920, should have sat on the knee of the brother of a man who was so famous more than 100 years ago!

We returned to England in 1853, but not to Abbey Road. My father had taken Over Hall, Gestingthorpe, in Essex, on the borders of Suffolk, where we lived till he died suddenly in the year 1860.¹

GESTINGTHORPE.—Over Hall was an ideal house and surroundings for a boy. The gardens, plantations, woods and fields abounded in bird life. When we arrived I found the large dove-house, or "duffus" as the villagers called it, full of wood pigeons' nests, and in process of time I made a collection of birds' eggs, many of them of quite a rare kind.

In those days people living in the country were almost entirely dependent upon their own commissariat, and consequently there were numerous outbuildings, including a complete brewery, a bake-house, a ham and bacon curing room with a special chimney for smoking them, a laundry, a dairy, and many other buildings the purposes of which I forget. The house was of course said to be

¹ Over Hall afterwards came into the possession of the Oates family and was the home of the splendid hero, Captain Oates, that "very gallant gentleman," who walked out of the lonely tent in the Antarctic blizzard in hopes that his sacrifice might save the lives of his friends.
haunted by a "White Lady" and though I never saw her, I was convinced that she was the cause of the strange sounds that I used to hear whilst lying quaking in my bed at night. Our beer was brewed in October every year, and when at home I was allowed to assist, much to my joy, as it meant sitting up all one night at some critical stage in the fermentation. Enough light beer was brewed to last the family and "retainers" for the whole year, and there was also made a special strong ale which could not be indulged in too freely without producing subsequent alcoholic gyrations.

I think this part of the country must have been rather behind the age even at that date, for the corn was reaped by hand and threshed with flails on the barn floor. The whole population of the village, except the harvesters, used to go gleaning before six o'clock in the morning, when the curfew bell in the church tower stopped them till eight o'clock at night, when it again tolled and they were free to resume.

There was no organ, or even a harmonium, in the church; the village choir was accompanied by a band of four performers—flute, violin, flageolet and bass fiddle. I do not think they knew more than ten hymn tunes, which were repeated over and over again. The first note was struck on the bass fiddle, and we all followed as best we could; but what we lacked in style we made up in vigour. The altar was quite bare of ornaments of any kind, and on each side were full sized "portraits" of Moses and Aaron, and the Commandments on a large board. Our pew was like a room with curtains all round it, very snug if one wanted an unobserved snooze. An "official" prowled about the church, armed with a long stick, and prodded, or hit, the boys on the head if they were misbehaving or inattentive. He was known as "The Dog Rap," and may have been a survival of the time when shepherds were allowed to take their dogs with them to church. I well remember on one occasion hearing a sounding whack followed by a boy shouting in shrill tones: "Don't yow dew that again or my faither'll shoot yer!" He was our gamekeeper's son standing up for his rights of freedom.

I simply adored our gamekeeper, Bocking by name. He taught me to shoot with a long single-barrelled muzzle loader, and I was a very fair shot up to the age of about twenty-five, when work prevented my continuing the practice. I also learnt from him the art of trapping vermin, which required a good knowledge of their habits and little weaknesses of appetite for certain baits in due season.
Over Hall was a fairly large house of the early Georgian period. I cannot remember the number of rooms, but I have a distinct recollection of the entrance hall, which was of considerable height with a wide staircase leading to a gallery overlooking the hall. I can remember a tablet in this hall on which was engraved the following, rather doggerel Latin verse with its English translation as follows:

[LATIN]

"Solitudo quam dilecta
Hinc in coelum via recta
Procul est insanitatis
Et theatrum vanitatis."

[ENGLISH]

"Hail, Solitude, how sweet thy shade,
For Holy contemplation made.
Far from the world no more I see,
That Stage of Sin and Vanity."

It is curious that I can so distinctly remember these verses whereas other more important incidents have completely escaped my memory. For instance, the only thing I can remember about the Crimean War is the opening verse of a patriotic song, very popular at the time, which began:

"What will they say in England, when the story there is told,
Of Deeds of might on Alma's height, done by the Brave and Bold."

I can remember one of my sisters in the big fashionable crinoline of that date singing it in the drawing-room with the plaudits of the guests. The only profitable and tangible results of the Crimean War to this country appear to me to have been the introduction of cigarette-smoking, learnt by our officers from their French and Turkish Allies, which put a stop to port wine nipping after dinner, and the alteration in the manner in which we had dined up to then, viz., with all the joints on the table. The Russian method was that of handing the dishes to the guests, which we now follow, and I remember that for some considerable time after the War, people used to ask each other, "Do you dine Diner à la Russe, or on the old-fashioned plan?" Before this change came into force, it was part of a gentleman's education to be able to carve well. My father insisted on my beginning to carve when I was about nine years old, and I am a "first-rate" carver to this day!

DAME'S SCHOOL.—I had not been very long at Gestingthorpe before I was sent to a boarding school in London. This was a
dame's school kept by two sisters of the name of King. Their father, a Mr. Joseph King, had had this school for some years, and was, in his day, a somewhat celebrated classical scholar, consequently I had as fellow pupils two of Charles Dickens' sons and a son of Hepworth Dixon, also Ainger, who was afterwards well known as Canon Ainger. There were also the sons of other celebrities in the literary and artistic world of those days whose names I unfortunately forget. The school was only a small house, No. 9, Northwick Terrace, St. John's Wood. It was close to the house of the late Sir Edwin Landseer, which stood in park-like grounds, almost opposite Lord's cricket ground, but it has long since been obliterated by blocks of houses. The Misses King knew Landseer very well. We often used to go there, and we boys used to watch his brother, Thomas Landseer, engraving some of the celebrated pictures. He was stone deaf, of which infirmity we often took advantage, telling him that what he was doing was all wrong, and indulging in other criticisms. We used also to go to see Charles Dickens, of whom I was rather afraid as he seemed to be somewhat austere.

Teaching was very different in those days to what it is now; we had to learn, but were never taught. I must have had a good memory, however, for during one term I learnt the whole of Macaulay's Lays of Ancient Rome, which during the following holidays I recited to my father, who gave me a substantial tip for my effort!

I was only at this school for about a year and a half, when I was sent to join one of my brothers at Pocklington Grammar School.

Pocklington.—This school still exists. It is a grammar school in Yorkshire, and was by no means a "Do-the-boys Hall," as we were excellently fed, but there was little or no discipline, and we were left much to ourselves except when in class. I was in the head master's house, where there were about thirty boys. The second master had about twenty boys, but the third master had no house. All three masters were "parsons," a relic of the times when monasteries were the only "seats of learning." In addition there were a large number of day-boys, amongst whom I remember a son of F. O. Morris, the naturalist, who lived near by.

One incident of some interest I can remember. I was out butterfly catching on Altherthorpe Common, with a boy named Bertie Smallpiece (naturally nicknamed Dirty Littlebit). My companion observed at some height a fairly large butterfly which he proceeded to chase, and as he had to keep his eye on the "prey,"
he fell repeatedly into the furze bushes and headlong over other obstacles, but he persevered and at last succeeded in capturing the specimen in his net. When he looked at it, he yelled “A Camberwell Beauty,” and from the exertion of his chase and excitement at the discovery he forthwith fainted! He soon recovered, however, and was able to add this beautiful and very rare butterfly to his collection. Mr. F. O. Morris saw it afterwards and offered to purchase it. I believe this was the last specimen of this butterfly that has been captured in this country, and the event caused quite a stir at the time, which was, I think, in the year 1858.

One of the day-boys was named Templeman, who lived with his grandfather, who had been a famous jockey in the “twenties.” Young Templeman used to ride a capital pony to school and back every day, a long distance, whatever the weather was like. I remember on one occasion going to Templeman’s house, when the old man mounted the pony and showed us on the carriage drive how he had won the “Oaks”—I think it was—in 1822.

As the school was in Yorkshire, a very sporting county, we naturally knew all about horse racing, and used to study the Turf Guide and Racing Calendars far more than we did either Virgil or Euclid. There was a small sweetshop in the village where the man who kept the shop was also a book-maker, and we boys used to have money with him on nearly every race that was ridden, and our conversation was always very “horsey,” and savoured of “pedigree” and “form.”

Whenever we had a whole holiday, four of us would club together and hire a tandem dogcart and drive either to York or some other place, taking turns to “handle the ribbons.” On one occasion we had a bad spill, but beyond a broken trace no damage was done.

We were spartans in those days. There was no bath room, but only a big lavatory with iron basins, and we made it a rule that every morning, winter and summer, we should all go there when we got out of bed and have basins of icy cold water thrown over us in turn. This was excellent training, and I have kept up my cold bath every morning to this day and attribute my virility at my age to this excellent stimulant.

There was a deep bathing pond in a field not far from the school, where each new boy was taught to swim directly he arrived if it was during the bathing season, which we arbitrarily fixed to commence on Valentine’s Day, whether there was frost or snow! The process of tuition was simple, but very effective. The tyro was stripped, seized by his ankles and wrists by four boys and hurled into the middle of the pond, where he promptly sank. When he-
had sunk for the second time, two of the elder boys would rescue him, and he was allowed to revive as best he could. This was repeated every day till the victim could swim unassisted to the bank. I was treated in this way and on the third day I swam to the shore. This rough and ready way of teaching swimming was a good one, as the art was learned so quickly, and it gave one absolute confidence afterwards if suddenly finding oneself in the water. I have been accidentally in the water a great number of times in my life, but have never lost my head and have always been a vigorous and untiring swimmer.

I had my first introduction to “Local Self-Government” at this school. We used to have tea without the presence of any master, and our behaviour became so bad that we decided to go in for “Reform.” We constituted what we called “The Grub Club,” with officers and rules. There was a president, whose ruling on any matter in dispute was absolute, a treasurer who collected the fines and disbursed the money so pooled, a surveyor or measurer who measured the dimensions of any mess on the table cloth whether from spilt tea, smeared jam, or other cause, and who also fixed the fine according to the size and disagreeable nature of the mess. The money thus collected in fines was spent once a month (or oftener if there had been sufficient “accidents”) on the purchase of “delicacies” to supplement the ordinary school tea. I think I must have done duty as “commissariat officer” as I had frequently to go to the village to purchase the special luxury which the “treasurer” had sanctioned. On one occasion the grocer refused to allow me a jar in which to put treacle as he said we never returned them. I was in despair, as I knew that to return empty-handed would mean a licking, but at last he consented to make a large cone of brown paper into which the treacle was poured, and I sprinted back in record time with the treacle oozing out at every pore.

Either the harsh climate of Yorkshire, or the spartan life we led, gave me a chronic cough, so that after being there about four terms, our family doctor, fearing consumption, said I must stay at home, or go somewhere where I should be better looked after. The result was that I was sent to read with a clergyman, who had a charming rectory on the coast of Norfolk, and there my education was continued amid the most delightful surroundings. Whilst I was at this rectory, one of my brothers, a judge in India, wrote to my father to say he would like one of the family to enter the Church, and that if I consented he would allow me £300 a year at Oxford or Cambridge if I would agree to take Holy Orders. I,
being of a somewhat practical turn of mind, stipulated that he should also consent to buy me a living as I did not want to be a curate all my life. He, very naturally, refused to carry out such a compact and the proposals fell through. Possibly if I had chosen the Church as a profession instead of engineering, I might have been a bishop by now!

Just before Christmas Day, 1861, my father died, and my mother had to give up Over Hall, and go back to London to live. My profession was fixed for me, and I thereupon entered on the necessary training of that of a civil engineer.

In those days there were only two "universities" at which such a training could be secured, viz.—Trinity College, Dublin, and King's College, London. Naturally, King's College was selected, and I was entered in the applied science department of that college in the spring of the year 1862.

King's College.—The Rev. Richard William Jelf, D.D., was the Principal, and had been so for nearly twenty years, when I entered as a student. He was a very quiet, gentlemanly scholar, and the tone of the college was excellent. I can, however, remember only one incident of an interview with him worth recalling. I was anxious to get leave from some lecture or other, and had to personally interview him with an application form duly filled in for the purpose. Unfortunately, I had spelt the word Professor with two f's, and consequently, although I was most anxious to get off, he gave me a long lecture on spelling and wound up by telling me that in the British Museum there was a letter written by Queen Elizabeth in which that mighty monarch had spelt the word Mediterranean in five different ways, and that not one of them was right! As I left his room I felt that anyhow I was in good company as regarded bad spelling. The Rev. S. H. Plumtree was Professor of Divinity, but I am afraid he could not have made the subject (which, by the way, was compulsory) very attractive as theology has never been a very strong point with me. It is interesting to recall, however, that one of my fellow students, a Russian, called Lugovitch, who of course was not Church of England, but a Greek Catholic, took all the prizes in that subject! I believe Lugovitch, who was a very clever student, eventually became the chief engineer of all the Russian government railway systems.

Amongst my other friends at King's College was Frederick Bodkin, a son of the then very celebrated Judge Bodkin, the Bow Street police magistrate, who had a large house on Highgate Hill, surrounded by extensive park-like grounds where I frequently paid visits. Another student was John Charles Coode, of Coode,
Son and Matthews, the well-known engineers of to-day, and also R. Peregrine Birch, who became a distinguished sanitary engineer, well remembered by many of the older sanitarians of the present time; and Tristram Ellis, who afterwards gave up engineering for art, and is well known as a water colour painter and etcher.

The Professor of Mechanics was Charles Percy Bysshe Shelley, a brother of the celebrated poet. Thomas Bradley was Professor of Geometry, one of the greatest geometricians that ever lived, and Dr. W. A. Miller, the eminent chemist, lectured and demonstrated on chemistry. His lectures often filled his part of the college with stinks of a formidable character, and on one occasion when he was showing us the process of converting oxygen and hydrogen into water, something went wrong with the "sparking plug," there was a terrific explosion, the gas container was smashed to smithereens, and the windows of the lecture room were blown into the Thames, which then flowed close under the college wall. No one was killed or seriously injured, but Dr. Miller, his assistant, and most of the "good" students in the front rows were much cut about by flying glass. I happened to be in a back row so fortunately escaped! The students from the medical department rushed in, and greatly enjoyed themselves for an hour or so patching up the wounded.

H. J. Castle taught practical surveying and exceedingly well he did it. We used to go once a week to Hampstead Heath, which has, I suppose, been more measured than any other part of England. I thoroughly mastered surveying, levelling and theodolite work, and became an expert with the "circumferentor," an instrument which would be difficult to find at the present time. James Tennant lectured on geology and mineralogy; he had a shop in the Strand close to the college, where all sort of specimens were exhibited in the window. I doubt if any such shop could now be found in any part of London. This was the whole staff of the Applied Science Department; there was no Chair of Sanitary Science, and in those days it is doubtful if there were many men in the whole of the United Kingdom who knew anything at all about sanitation.

Whilst I was at King's College, Garibaldi made his famous visit to England, and on one occasion he drove in state to the City, passing the college on the way. There was an enormous crowd, and some of us had armed ourselves with bags of flour, with which we pelted the crowd. Pandemonium ensued, and we had to retreat behind the gates, which we closed, and a free fight took place which only ceased on the arrival of a strong body of police.

The Strand was very narrow in those days opposite King's College, and Holywell Street, where books of very questionable
character were exposed for sale, was still in existence. Short's "wine from the wood" was opened about that time, and was much patronised by the students, but there were no restaurants in London as we know them now, and it was not till Messrs. Spiers and Pond came over from Australia and introduced them that the change from mere public-houses was made. The Thames, as I have already said, flowed close to the wall at the back of the college, and I used frequently to sit on the lions (which are still there and have faces more like professors than lions) and throw biscuits and buns to the people on the pleasure steamers which were then fairly frequent on the Thames.

One other recollection of those days will suffice and that is of the marriage of the late King Edward, then Prince of Wales. London was, of course, "en fête," and there were great illuminations. My people hired an omnibus, and invited a party of friends, and we drove through London to see these illuminations. The crowd was enormous, and I shall not readily forget driving through Temple Bar gates, which then existed, with a swarm of people hanging on to the omnibus like bees. When we got about half way down Fleet Street the police turned us into a side street where we had to remain until about three o'clock in the morning! The illuminations were certainly magnificent although they were all executed with gas jets or oil lamps, electricity not yet having been introduced.
CHAPTER II

LA VENDÉE

Towards the end of 1863, I left King's College and went out as a sort of unpaid assistant to a French resident engineer on the construction of a short length of railway in the department of La Vendée, France, the concession for which was in the possession of an English company of which my eldest brother was a director. The Engineer-in-Chief was a Mr. George Wilson, and the resident French Engineer a Monsieur Charnotét. The line under construction was between the chief town of La Vendée and Les Sables D'Olonne, a small town on the coast of the Bay of Biscay.

This chief town of La Vendée was then called Napoleon. It had previously been called Bourbon, and is now known as La Roche-sur-Yon, for when I was there the Franco-Prussian war had not taken place and Napoleon III. still held sway. There was no railway nearer to Napoleon than Nantes, which was then a terminus, and I had to drive in a diligence—a long and tedious journey. I shall never forget my helpless feelings when I arrived. I knew no French, and no one in the town knew any English. Monsieur Charnotét was there to meet me, but could only speak French. However, with the help of a dictionary and a grammar, I soon mastered sufficient of the language to make myself understood, and in a few weeks became quite happy in my new surroundings. The thing that struck me most was the remarkable cheapness of living compared with England. Monsieur Charnotét secured me a large furnished bed-sitting-room over a grocer's shop, with a separate entrance and staircase, for 25 francs a month, including attendance and bed linen, etc. I lived "en pension" at the principal hotel, consisting of the usual "déjeuner à la fourchette" at noon, and dinner at six o'clock, the cost being only three francs a day for both meals. The delicious red and white wines of the district were supplied free at these meals, and the food was appetising and abundant. Sables d'Olonne was, and is, a noted fishing port, and one of the chief centres of the sardine industry, so that we used to
have the most excellent fish, including fresh sardines, at almost every meal, as well as the toothsome dishes which French cooks know so well how to prepare.

My knowledge of levelling and surveying, which I had acquired at King's College, stood me in good stead, as my duties chiefly consisted in setting out the work, including railway curves, giving levels for the bridges, culverts, etc., and measuring up the work as completed. The metric system rather puzzled me at first, but when I got used to its simplicity I wondered why it had never been universally adopted.

The only drawback in Napoleon was the entire absence of sanitation; there were apparently no drains either in Napoleon or in Sables d'Olonne, and the privies were in a condition that beggars description. The only accommodation for washing one's hands at the hotel was a tap in the open back yard, and soap seemed to be the scarcest commodity. One of my first endeavours on settling into my lodgings was to purchase, or hire, a bath for my room so that I could enjoy my usual cold bath every morning. After considerable difficulty I was able to hire a large zinc bath, shaped somewhat like a coffin, which was usually let out to people who were ill and required hot baths, and this was conveyed to my room under the eyes of an astonished crowd. The next trouble was as to how it was to be filled and emptied every day, but eventually I was able to hire a soldier for one franc a week to execute this duty. I got my bath and he about doubled his pay, which was I think then about two sous a day for a private soldier.

Napoleon was full of soldiers as it was a garrison town. The Zouave regiments consisted of exceedingly smart little men who did most of their manoeuvres at the double. The officers had no mess of their own, but messed at the second and third-rate hotels in the town, and as I paid only three francs a day at the best hotel, I wonder what they paid for their meals?

My room was just opposite the entrance gates of the "haras" or Government breeding stable, and I used to watch the military governor of the establishment learning to drive four in hand. It was most amusing to see the difficulty he often had in driving his team out into the road with a number of men pushing and shoving the horses into the right place; he always seemed powerless with his whip, which is of course essential in manipulating a four-in-hand. Civilians were encouraged to have riding lessons, and for 25 francs I had 20 excellent lessons, both in the school and out on the roads.

Unless we had to be on the works, we were at the office every morning at 8 o'clock, as the French are very early risers. We
used to work until noon, when we had breakfast at the hotel table d'hôte. Then everyone adjourned to the café, where we smoked and drank coffee or liqueurs and played écarté or dominoes for about an hour, when we returned to work until about 5 o'clock. Table d'hôte dinner followed, and the café, or a theatre, finished the evening, everybody being in bed by 10.30.

On Sunday, if forty men chose to work, one of the staff had to be on the job to set out the work and look after the men. This was a great nuisance, and I often longed for the English ‘‘day of rest,’’ when everyone has to put up with enforced idleness. On such Sundays as we could be spared Monsieur Charnotét and I used to go shooting. There were plenty of partridges and quail, and the pointers we had were trained to retrieve as well as point, which seemed to answer wonderfully well, as they never ‘‘ran in’’ to find until told to do so.

On one occasion we were asked to go to a big ‘‘shoot’’ at a chateau about ten miles away from Napoleon, and as the whole affair was almost mediaeval, it is worth a short description. We drove out in an old-fashioned phaeton with our pointers and as many dogs as we could collect. When we arrived we found the lawn in front of the chateau crowded with picturesque villagers and their dogs of every breed and description. The chateau was a most imposing building with a double flight of stone steps leading up to the front door. We were greeted by our host in the outer hall, a tall man of distinguished appearance dressed in a green velvet coat with long wash-leather leggings, whilst shot, and powder flasks, whistles, and horns, seemed to be suspended, or attached, to every part of his body! We were then ushered into an enormous dining-hall, panelled in oak, and in which there was a long oak dining-table, devoid of any cloth, on which were plates, drinking horns, knives and forks with deer antler handles, huge loaves of bread and bottles of red and white wines in profusion. There were about thirty ‘‘sportsmen.’’ Our host took his seat in the centre of one side of the table, and immediately he did so there was a fanfare of French horns from about a dozen keepers who were ranged on one side of the dining-hall. Whereupon there entered a procession of retainers, clad in the family livery of a bygone age, followed by a number of cooks in white garments who carried, shoulder high, huge dishes containing alternately small ‘‘gigots’’ (legs of mutton) and woodcocks and snipe. Each guest helped himself, the ‘‘retainers’’ merely removing the dishes and plates as they became empty. It was before the days of breechloaders, so that each sportsman had hung from his shoulders his powder flask, his shot
flask, his tasselled game bag and other equipments, which made a picturesque and beautifully-coloured group, as the velvet shooting coats varied in all shades of greens and browns according to the tastes of the wearers.

Then we sallied forth for "le sport." Our host's woods extended for some hundreds of square miles, and as there were roebuck in plenty, as well as larger deer, and even wild boars and wolves, we were told to charge one of our barrels with buck-shot, which we did. The keepers then placed us in our various positions in the "drives" in the wood, and we waited for the army of village beaters and their numerous canine assistants to begin to drive the game towards us. The sound of a distant horn, faint shouts, and the baying of dogs reached our ears and the game began to move towards us. Hardly had it commenced when my neighbour round a corner fired, and cried out, "Elle est morte" (she is dead). I rushed round thinking he had killed a wolf at least, when behold, he was holding up a woodcock for me to admire! However, I was soon busy with hares, rabbits, a few pheasants, and other game, but I got no sight of either roebuck or wolves.

A wolf, however, had been seen, and special dogs were laid on its trail with a few sportsmen following, but as a wolf can trot as fast as a horse can gallop, I knew it was a hopeless task, and, needless to say, it was no more seen. We returned to the chateau about five o'clock, when the "bag" was laid out on the lawn in separate heaps. It consisted of roedeer, hares, rabbits, pheasants, partridges, quail, wild duck, woodcock, wood pigeons, and even blackbirds, thrushes, woodpeckers and many other birds, as it was considered quite orthodox to kill any wild animal, or bird, at these big battues. And so ended a delightful day.

Monsieur Charnotet and I had frequently to sleep at Sables d'Olonne when our work happened to be at that end of the line. The hotel there was one of those delightful old-fashioned places built round an open courtyard with galleries or balconies running all round, and leading to the various rooms. A splendid old vine had grown all over the balconies and walls, which had a most pleasing and picturesque effect.

The bathing at Sables d'Olonne was superb as the sands stretched for miles and were of a very flat gradient. One could walk out several hundred yards and allow a big wave to roll one over and over almost back to where one had started. There were big fish to be caught if one had the time and patience. I used to see men, who had both, go down to the edge of the sea at low water, and hurl a baited and heavily-leded line into the sea. Then they would
unroll a portion of their line from a winch on a stand and seat themselves on a camp stool by the side of the winch and wait for the bite. As the tide came in they retreated until after a few hours, they had an enormous length of line unrolled. Their reward was, however, a good one if they had one at all, for they would often hook, play and land a fish of 20 or 30 lbs. or even more in weight.

One night I went out with the sardine fishers. This was very interesting and rather weird. We started about five p.m. in an open boat, and sailed due west right out into the Bay of Biscay, until we arrived at the fishing ground. Then the sails were taken down and the oars were well muffled and shipped, and we waited till it was quite dark except for the moon. A long boom, longer than the boat, had meanwhile been lashed across the stern of the boat and from this was suspended a small mesh net immersed about three feet in the water. Then the bait was thrown out by means of a large wooden spoon in such a manner that it floated on the surface of the water, covering a large area. This bait was called "rogue," and was said to be the waste oil pressed from the sturgeon's roe in the preparation of caviare; it floated on the water and attracted the sardines, which came in thousands to feed on it, making the water quite boil in their rush. Then the boat was very quietly rowed through the struggling mass of fish, until the net was full, and it was hauled on board, and the glittering silver like sardines were thrown into the bottom of the boat. This process was repeated again and again until we were literally knee deep in fish, and the boat could hold no more. Then it was up sails and away for home as quickly as possible, as the first boat to arrive got the best prices for their catch. The instant we arrived at the head of the pier at Sables d'Ollone, which we did at a very early hour of the morning, a tow rope was thrown to one of a veritable crowd of women, and we were towed up to the quay. All the way up the owner and captain of the boat was bargaining at the top of his voice with a woman who was apparently acting for the purchasers of our catch, our captain of course swearing that no other boat had caught any fish, and thus enhancing the price. The fish are sold by the thousand and the price varied between 10 francs up to 30 or even 40 francs per thousand according to the supply available. Women seemed to do all the work after we arrived, counting the fish in handfuls of 10 into baskets, and packing and loading the baskets into carts which conveyed them to Nantes by road, where the factories which completed the tinning processes were situated.
I was about a year on the construction of this railway and when I returned to England at the end of 1864 I spoke and read French very well; unfortunately, after my return to England, I had few chances of keeping it up, so that in a few years it became very rusty though not altogether forgotten.
CHAPTER III

METROPOLITAN BOARD OF WORKS

On January 1, 1865, I was articled to Mr. Joseph Bazalgette, the chief engineer of the Metropolitan Board of Works, which was afterwards merged into the London County Council. Mr. Bazalgette eventually was knighted and died some years ago. One of the few documents I have preserved is that of my articles, in which I am described as "an infant of the age of 19 years," and that the premium paid was £420. Further that I became his "pupil and apprentice in the profession, business, or employment of a civil engineer," and that I bound myself to "faithfully, diligently, and honestly serve him and obey his lawful commands, and also that I should "in all respects, demean and behave myself as a good, true and faithful pupil and apprentice," at the same time my guardians, who were my mother and my eldest brother, undertook to "find and provide me sufficient meat, drink, lodging, clothes, washing, medicine, medical attendance, and all other necessaries." For all this my "master" agreed that he "should and will according to the best of his skill and knowledge, teach and instruct, or cause to be taught and instructed the said (me) as his pupil and apprentice in the practice, profession, business, or employment of a civil engineer," and a great deal more of the usual legal jargon.

I have given somewhat copious extracts from this wonderful document (which I do not believe I ever saw, after it was signed, until now), as the question of the proper wording of articles of indenture of engineering pupils is being considered at the present time and may possibly be settled before this book is published.

I believe that, in those days, if I had misbehaved myself I might have been brought before a magistrate who could have ordered me a whipping, but no doubt my conduct was immaculate and no such dire result followed. There were five other pupils, besides myself, whose names I can remember, viz.:

Carfrae, who was connected with a large engineering firm of that name in Scotland; two brothers named Braham, who both
went to India in the Public Works Department; Gosling, whom I lost sight of after he left; W. F. A. Archibald, who afterwards went to the Bar and became a Master in Chancery (he is still alive and was recently knighted on his retirement); and Edward Monro, who afterwards became my brother-in-law, as we married sisters. He became an engineer in due course and was abroad a good deal in connection with asphalté, but died at an early age.

The offices were in Spring Gardens, the same as are now occupied by the London County Council pending the erection of their palace on the other side of the river. That portion of St. James' Park near the offices was, however, very different then to what it is now, as the additions to the Admiralty, and the magnificent avenue leading from Charing Cross to Buckingham Palace had not been even contemplated. That part of the park was grass and trees, under some of which were tethered cows, and for a penny one could obtain a glass of milk and have the pleasure of seeing it drawn from its "pristine source."

To these offices I went daily to serve my apprenticeship, and fortunately I went there at a time when the great main drainage works of London were in hand, and some of the lengths of the Thames Embankment were being constructed or designed. It would be useless for me to attempt to describe these great works, suffice it to say that I gained a considerable knowledge of municipal engineering on a large scale. Mr. Bazalgette had an excellent staff; the three chief engineers under him were, Mr. J. Grant, Mr. T. Lovick, and Mr. E. Cooper. Mr. Grant is well known as having been the first English engineer to make scientific studies and investigations into portland cement, and I remember that at one period of my pupilage I assisted in carrying out some experiments, at Messrs. Eastwood’s works, into the strength of concrete beams of various descriptions, by subjecting them to certain strains and pressures, carefully noting the results, which were handed to Mr. Grant. The head of the drawing office was a Mr. Gunyon, an extraordinarily clever man, and at the same time of a most kindly and considerate disposition. I am afraid that sometimes the behaviour of the pupils must have sorely tried him, but he never appeared to be ruffled and we all dearly loved and respected him. There was also an excellent staff of draughtsmen. One I remember whose name was, I think, Waldeck, was ambidextrous, and he did nearly all the freehand drawing which was required and designed the beautiful ring-bolt, lion-headed, bosses on the face of the Thames embankments, as well as the graceful lamp standards.

In those days the chain-men, who went out on surveying or
levelling jobs, were not on the permanent staff, but were merely "odd" men who sat in a corridor until wanted, and were then paid a shilling an hour whilst the job lasted. Some of them would thus be out of work for days, and as they often looked half starved they were the recipients of many small tips from some of us. I hope this casual labour system has now been discontinued.

I did not see much of Mr. Bazalgette, as naturally he was much occupied, but I remember that on one occasion he sent for me to bring him a drawing on which I was engaged. He complimented me on the drawing but not on the lettering, and when I said that this could be better done by one of the paid draughtsmen, he reproved me, and said that an engineer should be able to do his own lettering and printing in a neat manner, even if it were only "block" printing, and this advice I afterwards followed with great advantage.

There are one or two amusing incidents which I can recall during my pupilage. On one occasion, having no special work in hand, I devoted the morning to drawing and painting in gay colours a number of figures of ballet girls, snakes, skeletons, and similar "subjects" which I carefully cut out and attached each one to a piece of thread. I then chewed paper to a proper consistency and attaching the piece of thread, I dexterously threw the paper ball up to the ceiling, to which it adhered, leaving the figure dangling in the air, moving and gyrating with graceful movements with every current of air. As ill luck would have it, when about a dozen of these figures were in position, the door opened and in came Mr. Bazalgette and a deputation of French officials who were obtaining information on the subject of local government. Mr. Bazalgette's looks were ominous, but the delegates were delighted with my objets d'art, and it was with difficulty that he could get them to leave the room. I was of course duly "carpeted," and received a severe wigging about waste of time, etc., but I feel sure that those delegates went back to France with some knowledge as to how a ceiling should be decorated.

I am afraid I never could resist playing practical jokes, and one comes to my memory which I perpetrated at that time. Volunteering was in full swing and one of the draughtsmen was an ardent volunteer. One Saturday morning he came to the office in his regimental trousers, but an ordinary coat, as his new tunic was to arrive from the tailor that morning. He happened to be out when the tunic was delivered, and I could not resist the temptation; I promptly undid the parcel, hid the tunic, and placed in the parcel an old discarded office frock coat all tattered and frayed. He duly
carried off the parcel to attend some special parade, or march past, that afternoon, intending to change in the pavilion. Unfortunately I was not present to see the development of my joke, but from his language to me on the following Monday morning I conclude that it was entirely successful.

One of my fellow pupils was a bit of a "masher," so unknown to him I filled his umbrella with tiny bits of white paper, folding his umbrella up afterwards most neatly and carefully. Fortunately I was able to enjoy the fruits of my labour, as I purposely went with him for a walk up Regent Street. A shower of rain came on, up went the umbrella, and the result may be imagined.

Passing from these trivialities, it is worth recording that I was on one of the sections of one of the main sewers then under construction, a brick sewer of 10 or 12 feet diameter. Part of this sewer was in open cutting in a not very wide street with houses of a fairly valuable description abutting. The ground was treacherous, and notwithstanding every precaution and splendid timbering, settlements began to take place and cracks in these houses appeared. I had to take careful observations and detail measurements of these cracks; photographs were taken and there was a tremendous fuss as of course actions were threatened, with cross actions between the Local Government Board and the contractor. In the meantime the contractor quietly proceeded with the work as if nothing unusual was happening; it eventually transpired that without saying a word to anyone, he got a friend of his to approach the owners of the various properties and eventually purchased all the houses in the street. When the sewer was completed, he repaired the houses, improved and painted them, and sold them for more than he had given for them!

Contractors in those days might not have been the great men they are now, but they were shrewd men of business, and in many cases had sprung from the ranks of labour. They had such practical knowledge that they could give a very reliable tender for any ordinary work by merely examining the drawings with a two-foot rule; many of them would have scorned the idea of being furnished with bills of quantities when making up a lump sum contract.

I was also on the works of construction of the section of the Thames embankment between Westminster and Waterloo bridges. I happen to have preserved the specification for this work, which is dated July, 1863, and is only sixty-five pages in length, including the general conditions and schedule of prices. I venture to think that if such a large undertaking, including a very large number of sewer diversions, alterations of streets and buildings, etc., was
now contemplated, the specification would be of much greater length. Since the year 1863 and even now, the interpretation of specifications by lawyers has produced endless squabbles and litigation, and it would appear that the longer the specification the more it is open to attack. I believe that the whole of the immense contracts carried out by the Metropolitan Board of Works were satisfactorily settled without a single appeal to the Courts.

The specification is also interesting as the prices given in the schedule of prices are very different from those of to-day when wages have increased by leaps and bounds. For instance, the price of excavating from 15 to 20 feet below ordnance datum was only 3s. 9d. per cube yard, Portland cement concrete 1 to 8 in situ, 10s. per cube yard, brickwork in cement, best stocks, per rod reduced, £16, washed sand per cube yard, 4s., Portland stone per cube foot, 28. 4d. and Aberdeen granite, 3s. Bricklayers' wages were 6s. 6d. per day of 10 hours, masons, carpenters and smiths the same; engineers 7s. 6d. a day, excavators, 4s., labourers 3s. 9d., and watchmen 3s. per day or night.

What should we say to such wages to-day when the plea is that everyone must have a "living wage," ignoring the fact that it is just this inflation of wages that makes living more expensive, in other words it is a vicious circle which can have no end.

One incident I can recall in connection with the construction of this length of embankment. The contractor was induced to try, instead of the usual clay coffer dam, a short length of special oval shaped cast iron caissons which were guided into place by piles and sunk by their own weight, into the bed of the river. Men were employed excavating the bottom inside these caissons under air pressure which excluded the water. These caissons were in short lengths bolted together at the outside ring flaniches and carefully caulked. They were of course strutted on the land side to resist the pressure of the water in the river outside. All went well until one night when there was an exceptionally high tide and the whole length of this dam was overturned by the pressure and the works were completely flooded. Fortunately it happened at night so there were no casualties. How much this cost the contractor I do not know, but I do know that he at once scrapped the caissons and reverted to the old-fashioned, but thoroughly reliable, coffer dam. This was a good lesson to me, and I, in common with most engineers, have always depended on the coffer dam to ensure a dry job.

There being no "restaurants" in the west-end of London in those days, I used to lunch at a little beer-house in Spring Gardens.
REMINISCENCES OF A MUNICIPAL ENGINEER

(long since pulled down) on "sausages and mashed" helped down with that excellent beverage porter, which has also disappeared from London.

The opera at His Majesty's Theatre in the Haymarket was very popular in those days, and no wonder when such stars as Grisi, Titiens, Foli, Santley, Albani, and Mario could be heard in one cast. I was a great frequenter of the gallery, which cost only half a crown, and there was no amusements tax in those days.

On my twenty-first birthday, viz.: January 15, 1867, my career might have come to an untimely end. I had a holiday for the occasion, and on leaving home I expressed my intention to go skating on the lake in Regent's Park, but meeting a friend on the way, he persuaded me to go with him to the Crystal Palace instead. When I returned home rather late in the evening, my old nurse fell on my neck and shouted, "Oh, marm, here he is! here he is!" and my mother rushed out and embraced me. Then I learnt for the first time that there had been a terrible ice accident in Regent's Park, some hundreds of people having been immersed in the lake, and forty of them drowned. My family had feared, as I did not return, that I was one of the victims. Indeed one of my brothers had rushed off, on hearing of the catastrophe and had watched the bodies being dragged out of the lake to see if he could identify me. The lake, which was then dangerously deep in places, was afterwards filled in, and is now only about three feet deep everywhere. I sometimes wonder whether it was mere chance that I met my friend that morning or whether such things are pre-ordained.

In the same year, viz., 1867, I was present at a rather celebrated Derby when "Hermit," a rank outsider, won in a blinding snowstorm, and this on May 22.

The term of my pupillage with Mr. Bazalgette expired in 1869, but he kept me on for a year longer as an assistant on various private jobs that he had in hand. Amongst others I surveyed and levelled the Cray Valley for a joint sewerage scheme, and also Oxford and Weston-super-Mare, but whether these schemes were carried out or not I do not remember.
CHAPTER IV

JAMAICA

In the year 1870 I was offered, and accepted, an appointment as a District Engineer in Jamaica, and at once proceeded to purchase an outfit and to book my passage at the Royal Mail Steam Packet Company's offices in Moorgate Street. In due course I sailed from Southampton in The Shannon, a big paddle steamer. I believe it was her last voyage, for although she was fairly fast for those days, and free from rolling, she was excessively greedy of coal. But it is something to remember that I have crossed the Atlantic in a paddle ship. The voyage was uneventful except that there was a complete eclipse of the sun one day, which produced a most weird effect on the sea and caused considerable commotion amongst the live stock which we carried for food, as of course it was before the days of cold storage and other luxuries with which ships are now fitted, and all passenger ships had to carry a regular farmyard on the deck.

As we neared the tropics we saw shoals of flying fish, often chased by dolphins, a most beautiful sight as the dolphins leaped from wave to wave like greyhounds after a hare, with their lovely iridescent bodies shining in the sun and the flying fish scattering in all directions. Incidentally a few flying fish used sometimes to seek shelter on our ship, and proved to be excellent eating.

We touched at the Island of St. Thomas, which seemed to rise out of the sea like a painted picture without any perspective, a curious effect which took some time for the eye to focus. We skirted the beautiful Island of Hayti, a Black Republic, and I was told that in Jamaica there were at least four or five ex-Presidents of this Republic who had escaped from the island in rowing boats manned by faithful adherents, but that each one had managed to bring the "Treasury" chest with him!

On the first day of my arrival in Kingston I was invited by the Governor (the late Sir John Peter Grant) to a state dinner, and I dressed myself suitably for the occasion. It was then the fashion to wear thin silk socks of bright colour with one's dress
shoes, and consequently the mosquitoes soon discovered my newly-arrived insteps and ankles, and all through that dinner I suffered a martyrdom aggravated by the heat and my natural nervousness as a new-comer amongst a large array of uniformed officials.

Colonel Mann, R.E., was then the Surveyor-General, under whom I was employed. His headquarters were at Kingston, but my office and place of residence were at Mandeville, in the Manchester hills, about fifty miles from Kingston. There was no railway in those days except between Kingston and Old Harbour, a distance of about 25 miles. There were two other District Engineers, besides myself, and we shared the Island; my District was the South-west and extended from Kingston to Savanna-la-Mar, but not much further north than Mandeville. My district was in turn divided into three divisions with an Inspector living in each division. Mandeville was some two thousand feet above sea level and not at all a bad climate. My office was over the powder magazine, an isolated building standing in the middle of the "Village Green." The powder and other explosives were only stored for blasting in connection with the work of my department, but I often used to feel that some careless "Nigger" workman in fetching out his explosives might blow me and the office into the other world. Fortunately, they are all barefooted, so that the chance of an "ignition" spark was small, and they had the decency not to smoke in the building.

My work chiefly consisted in the construction and repair of Government buildings, and work somewhat akin to that of a county surveyor in England. My largest work was that of superintending the construction of a stone pier and girder bridge, over the Dry River, which ran absolutely dry for eleven months out of the year, and then rose about twenty feet in depth during the rainy season. When I arrived there was a difficulty in getting water for the masonry, a rather curious anomaly in bridge building. Wells had been sunk without avail and things were at a standstill. Hearing that the water rose to a certain height in a normal rainy season, I caused a large pond to be dug at the side of the river. I then covered this with bamboo wattles and clay, and constructed a wooden weir at the right level over which the water toppled in due course and gave us sufficient water to continue building the abutments of the bridge during the dry season.

Amongst my other duties was the repair of fords across rivers without bridges. There was a certain ford which constantly gave trouble as dangerous pits were washed in it, and these had to be filled up with big stones at considerable cost. I prospected up
and down the river, and took observations of the currents and, instead of repairing the ford, I shifted it about 150 yards up the stream, and at a trifling cost made a ford which, so far as I know, never afterwards required any repairs. On another occasion a road near the coast required extensive repairs; there was no quarry of suitable stone within several miles, but casting about, I found masses of coral on the beach close by, and set women to work to collect it in heaps, after which it was broken to the required size, laid on the road and rolled, and it made a park-like road, one of the best in the Island.

I give these few instances to show how an engineer is thrown upon his own resources in a colony, and how he is obliged to be independent of text-books, which cannot give advice on the almost daily problems that arise.

The most extraordinary experience I had, however, was the following. A man was sentenced to death for murdering a constable, and I had an official intimation that on a certain day the man was to be hanged in Mandeville gaol, and that I was at once to construct a gallows, and to see that all necessary arrangements were made. A hangman would be sent from headquarters the night before the execution—which was to take place at 8 a.m. on a certain date. Only a fortnight was given me. I had never seen a gallows in my life, but I had on my staff a black carpenter, and I sat down and designed an open gallows, with hinged platform, stairs, and all as complete as I could think of so as to ensure no bungling. We worked day and night at it, in the yard attached to the stores, and the night before the execution it was erected in the yard of the gaol.

At midnight the hangman arrived in a buggy with two constables in charge of him and we had a rehearsal. He was a merchant sailor who was in gaol at Kingston for desertion of his ship and was to receive his release and three guineas for the gruesome job. I was very nervous as to the result, as naturally it was a serious responsibility for a young man, and I feared some bungling might occur through want of proper appliances.

Needless to say, I did not sleep and was early at the gaol. The usual solemn procession from the cell to the gallows took place with the chaplain reading portions of the burial service, the sheriff, the governor, the doctor and I following. The most unconcerned of any of us was the murderer, who seemed to be perfectly callous. The man mounted the gallows, the drop fell, the body swung round and it was all over. I seized the doctor's hand who was standing next me, and said, "Is he dead, doctor, or will there be a struggle?" He assured me he was dead, and certainly one of the most anxious moments of my life was over.
I have purposely omitted many gruesome details of the preparations of the necessary paraphernalia, which all rested on me, but I came to the conclusion that hanging was one of the most humane forms of putting an end to human life, provided it is absolutely necessary to take life.

My work took me long journeys which I either performed on horseback or in a pair-horse buggy. I kept five horses, the most expensive of which cost me £40, the cheapest, a pony, or cob, £25. This pony I taught to follow the buggy like a dog. This was easily effected in about a fortnight by merely always feeding him from the back of the buggy. I called my horses Harlequin and Columbine, and this pair I drove nearly always. Pantaloon and the Clown were both saddle and draft, and the pony was called Jack Spratt.

I used to start before daylight, and those who have never seen a dawn in the tropics can have no idea of the beauty of nature at that hour. There were no hotels in Jamaica in those days, and consequently I had to sleep at any planter's house that happened to be near to any place I had to visit, and most hospitably I was always received. Many of the older planters in those days (1870-71) had settled in Jamaica in the slave days, for, be it remembered, the slaves were not emancipated until the year 1838, and consequently the men over 60, whom I met, had been 32 years of age at that date, and had many of them come over to Jamaica at the age of 21 or even younger. I often asked for information as to whether slaves were badly treated, and the invariable reply always was, "Of course not; they were too valuable." I was given only two instances of any ill-treatment, which were as follows:—

On one occasion a choleric planter, angered with the manner in which his slave had put the horse into his buggy, seized a spare shaft and hit him over the head with it. Unfortunately he hit him with the iron projection which protrudes below the shaft and this entering the slave's head killed him on the spot. There was, of course, an inquest and the coroner's jury (all white men of course) brought in a verdict of "Killed by the visitation of God!"

The other story is, that two well known doctors of that day quarrelled after dinner over the right manner in which a leg should be amputated, and to settle the dispute one of them sent for an old slave, who was not of much value, and there and then took off his leg to show the other doctor that he was wrong and that he, the operator, was right!

One of the works on which I was engaged was the erection of a wooden trestle bridge across the Black River at a place called
Cataboo. This was a dreadfully unhealthy, swampy place, abounding in mosquitoes, alligators, and other obnoxious creatures. Even the black workmen used to get fever a few days working in such unwholesome surroundings, and I always suffered with fever after my visits of inspection in this locality.

When I first arrived in Jamaica I was unable to distinguish one nigger from another. They all looked exactly the same, like a flock of sheep, but gradually I began to see a marked difference, and eventually could pick out my own servant from a crowd without difficulty.

The women were great church attendants and would walk many miles to attend the services on Sundays. They used to walk there in their old clothes, carrying their smart frocks and boots in a large bundle. As they neared the church they would disappear into the "bush" and in a short time reappear in their boots, white cotton stockings, and all their finery. It was the etiquette for sisters to take turns on alternate Sundays in being mistress and maid. The "servant" did not dress up finely but meekly walked behind her "mistress," carrying her prayer-books, umbrella, fan, etc. This custom was a survival evidently of the early Georgian period, when ladies of quality were always thus followed by their servants on state occasions.

My seat in Mandeville church faced the black congregation, and the first time I heard, or rather saw, a hymn sung I was really startled. I was looking at a sea of black faces when suddenly these black faces all turned red—they had opened their mouths!

I found that my workmen, all niggers, had a rare sense of humour, especially with regard to people's names. For instance, they of course called me "Massa Bullnose," and a very thin, tall assistant of mine, whose name was Scharschmidt they immediately christened "Massa Sharks-meat." Another of my assistants called Wortley, who was certainly not very useful, they called "Massa Wortless," and they were justified in so doing. My chief, who was officially known as Director of Roads and Surveyor-General, they dubbed as "Doctor of Roads and Surgeon-General." They were wonderfully musical, especially as to time. When a gang of men were at work, they would select one of the party, preferably with a high falsetto voice, to sing a few words as they all raised their pick-axes in unison, and then as these tools fell together, the whole party would sing together in guttural tones, "But the Queen don't know." The singer of the solo generally had some petty grievance to complain about, to which the gang responded in this manner. They seemed
to work better under this stimulant, and the chorus never seemed to be altered.

The nigger, as a rule, was not given to hard work if he could possibly avoid it, but this is excusable in such a climate where nature is so generous and prolific. For about fifty shillings a man could purchase an acre of virgin land. It would take him a few weeks to clear it. He would then plant young coffee trees, and in between the trees he would plant yams, bananas and other edible products on which he could live with the help of a little work whilst his coffee plants were growing to maturity. At the end of five years his coffee would be in full bearing and the crop, which would take about a fortnight to pick, would be worth at least £80 to £90 a year for the next 80 to 100 years. Why should a man work under such happy conditions?

There were fortunately no venomous snakes in Jamaica, but numerous stinging and biting insects. I was stung one night in bed by a scorpion, on the shin, which made the whole of my leg burn as if it had been on fire, and I was lame for some days afterwards. The following is a remarkable incident which occurred to me. I was playing billiards at the club when a small heap suddenly fell on the cloth just as I was preparing for a stroke. I thought it was the contents of the pipe of my opponent, but to our amazement it began to move and disentangle, and behold—it was a mass of tiny scorpions who scattered in all directions. They could not escape up the overhanging sides of the table, and we killed 32 little scorpions about an eighth of an inch in length. Then we saw, lying on the table, the body of a large scorpion with the whole of the inside completely eaten out, although there were still signs of life in the creature. I was afterwards told by a naturalist that, when the young scorpions are hatched, they climb on to the back of their mother and actually live on her until they are old enough to seek their own fortunes. What had evidently happened, in the case which I was fortunate enough to witness, was that the mother scorpion had clung to the shingle roof over the table until her strength had given way, when she had fallen with her unnatural brood upon the table, just at the critical moment when they were old enough to go out into the world.

The extraordinary thing about this incident was, that although the whole of the vital parts had been eaten away in the mother scorpion, and she looked like a mere crabshell that has been thrown on to the dust-heap, there was still vitality left, and she was able to move her feet and claws. Truly the ways of Nature are wonderful and obscure.
The damp heat of Jamaica was particularly trying to me, and although Mandeville was not so bad, I had to spend a great deal of time in more unhealthy districts, such as Black River and Savann-la-Mar, whence I used to return suffering more or less from a sort of depressing low fever, so that after I had held my appointment for two years I applied for sick leave and returned to England in December, 1872.

I could write much more of my curious experiences in the Island, but should take up too much space if I did so, and will, therefore, content myself by saying that the experience was most beneficial to me, as I gained a considerable amount of self-confidence, and a good insight into practical engineering.

After my return to England, as my health did not greatly improve, I consulted a number of medical specialists who, so far as I remember, always diagnosed my symptoms as being in complete accord with their pet disease, and after my sick leave expired, I decided not to return to Jamaica and sent in my resignation. Late in the spring of 1872 my former fellow pupil, Edward Monro, asked me to come out to him in Hungary. He had been married about a year and was acting as engineer to a large asphaltte Construction Company, who were constructing many miles of compressed, and mastic, asphaltte in Budapest. Accordingly I went, and was there about three months, sleeping and breakfasting at the Hotel Koeningen von England, and having my other meals at his house. His wife's sister was staying with him and my fate was sealed, although I did not marry her till five years later.

On my return to England I filled up my time in an architect's office, where I learned a smattering of architecture and a good deal about the difficulty and even personal danger of surveying in the City of London, where I often stretched over the eaves of a high building in order to drop a tape line with my assistant holding my heels to prevent my tumbling off.

Towards the end of the year 1873 I saw in a newspaper that there was an appointment vacant, at £500 a year, as City Surveyor of Exeter. I had very little idea as to what were the duties of a surveyor, and still less as to how the appointment was to be secured, but I wrote off for particulars and sought the advice of a friend at the Metropolitan Board of Works. He advised me what to do, and I immediately gathered together testimonials as to my professional ability and social respectability! These I forwarded to the Town Clerk with a formal application for the appointment. Acting under my friend's advice I then proceeded to Exeter, and took up my quarters at the celebrated New London Hotel. From
that address I forthwith issued to each councillor a letter couched
in "modest" terms asking them to read the printed copies of my
application and testimonials, which I enclosed. I then proceeded
to call on all the members of the Council, either at their private
houses or places of business, and although I was exceedingly well
received by every one of them, I must confess that canvassing for
oneself is not altogether a pleasant occupation. But I do not see
how this can be avoided if the councillors desire to identify the
individual with his application and credentials, and there is a
precedent for this procedure when a candidate seeks parliamentary
election, and calls personally on many of the voters in order to
solicit their support. What is good enough for an "M.P." should
be good enough for a surveyor.

There is a story told of a well-known doctor, long since dead
after a very successful career, who in his early days was an applicant
for an appointment under a certain Board of Guardians. He called
one day at the shop of a guardian who happened to be a grocer.
The grocer was very busy, and in a very snappy manner said, "I
suppose you've called for my vote, young man?" "Not at all,"
replied the young doctor. "I've called for a pound of figs and look
sharp about it!"

I forget if this candidate got the appointment he sought, or not,
which rather spoils the story. However, in my case I did get the
appointment, which I held for ten years, only resigning because I
was anxious to "better myself" as servants call it. There is one
incident that I can recall with regard to my election which was told
me afterwards. The unsuccessful rejected candidates, about eight
in number, were discussing how I pronounced my name, after they
had been told that I was the successful candidate, and one of them
said, "I don't know whether he calls himself Bulnoir or Bullnoise,
but he has been a bête noir to us!"

My name throughout life has been a bit of a stumbling-block
to many people, as I have persisted in pronouncing it in the French
manner, i.e., ignoring the "s" at the end, although large numbers
of my friends persist in calling me "Bullnoise" which I do not mind
in the least. At school and at King's College I was always called
"Bully" for short, although I hope and believe it did not represent
my character!
CHAPTER V

EXETER

Having thus been elected by an almost unanimous vote of the Town Council, I commenced my duties in January, 1874, and at once settled down to work.

I naturally found the numerous Committee and Council Meetings rather trying, as Surveyor criticising was then, as now, a favourite pastime with some of the more cantankerous members of Town Councils and other similar bodies. Tact, patience, and good temper are essential qualifications for such a position and I suppose, like the proverbial eel, one gradually got used to it.

When I started I found that there was no map of Exeter, and one of my first duties was to report on the condition and position of the sewers. Without a map this was impossible, and to survey the City would have required a large staff and considerable time. The Ordnance Department had commenced the survey of certain towns on the 1:500 scale, but Exeter would not be reached for many years. Negotiations were opened with the Department, and eventually they undertook to make the survey at once if the City would contribute four-fifths of the cost. This was agreed to and the survey proceeded, and was finished in two years.

The survey of the sewers was not a pleasant job, as many of the larger sewers had been constructed in the sandstone rock, many years before, and were without any lining. The inverts had consequently worn into deep pits full of stagnant sewage into which one often flopped over one's sewage thigh boots, a very unpleasant experience. On one occasion my sewer foreman was carrying a lamp in front of me, when an explosion took place, but fortunately the draught was behind us, and except that my foreman had his whiskers burnt, neither of us was injured. Providentially also we were near a manhole, up which we climbed in record time, but the shock of the explosion split the arch of the sewer for a distance of nearly 100 yards, so that our escape was a lucky one. This explosion was no doubt due to an escape of coal gas from a main, and
similar explosions are probably due to the same cause, as I do not believe that they are caused by "sewer gas" to which they are sometimes attributed.

There was no fire brigade in Exeter at the time of which I write, and the waterworks belonged to a private company. There were three or four insurance companies, however, and they each had a manual fire-engine under a separate captain, who was authorised to pay bystanders a shilling an hour for pumping. Disputes constantly occurred between these "captains" whilst the fire was raging, and the extinguishing of fires was often rather uncertain with such appliances. The insurance companies complained to the water company of insufficient water and pressure, and the water company retaliated by alleging that the fire-engines were old and out of order. The city corporation consequently purchased the waterworks and mains from the company, and I reorganised and reconstructed the whole of the works.

Complaints of want of pressure still reached me, and to satisfy myself I was called at once on the outbreak of a fire and dashed off to the spot. It was rather trying after a hard day's work, and in my "first" well-earned sleep, to be roused by violent knockings at my front door and peals at the bell, and have to jump into my firemen's clothes and jack boots and rush off, with the panting policeman who had roused me. At first there certainly was some difficulty in concentrating the water at certain points, owing to the hilly character of the city, and it took me some time to relay old mains and link up the whole system with the necessary valves, etc., but in due course everything was put right, and I then asked the Council to let me form a hydrant brigade, as the pressures were sufficient to do without an engine in many cases and we often put out a fire before the arrival of the first fire-engine.

The waste of water in Exeter was also formidable, owing to the considerable heads of pressure in the low-lying districts, and to old and faulty water pipes and fittings. The late Mr. George Deacon, then city and water engineer of Liverpool, had quite recently introduced his waste water meter system, and my Council gave me permission to go to Liverpool to investigate the system and to report on it. I spent three profitable days and still more profitable nights with the inspectors in a thorough study of the system, and on my report the Council instructed me to instal it at Exeter. This I did, and the result in a few months was remarkable. I cannot remember the figures for the whole city, but I know that in one district the night waste alone amounted to 78 gallons a head. When inspecting this district it was not necessary to use
the stethoscope at the stopcocks, as the hissing noise of the escape of water at the ballcocks and other fittings sounded in the still night like a gigantic swarm of bees! The result of this installation and some months' hard work reduced the waste in this district alone to about 8 gallons per head.

An even more interesting work which I carried out later was the scraping and cleansing of the two rising mains which conveyed the water from the River Exe from the pumping station at Pynes to the reservoir in Exeter. As this was one of the first, if not quite the first, attempt to scrape a water main whilst in use, it may be interesting if I give some extracts from the report of the Water Committee to the Council on the subject, as I happen to have preserved a copy. The report commenced as follows:—

**Scraping and Cleansing Rising Mains.**

The Committee submit herewith the Surveyor's report, showing the details, progress, and results of this work. The gain to the undertaking is considerable, not only in the increase in the amount of water supplied to the City, but also in the removal of impure matter in the pipes, which must have affected injuriously the quality of the water. The Committee purpose to adopt the Surveyor's suggestions, and have the mains cleansed yearly, and as all the machinery for the purpose is now at hand, and experience has been gained in the work, the cost and labour will be but small compared with that incurred last year.

The Committee desire to express their high appreciation of the skill and untiring energy shown by the Surveyor and his staff in the progress of this work, they having conducted the whole of the operations without the employment of additional hands.

My report which followed contained *inter alia* the following information:—

"Acting upon a resolution passed by you that I should report upon the condition of the rising mains, I proceeded to ascertain what amount of extra head of pressure was generated in the rising mains between Pynes pumping station and the reservoir at Dane's Castle, and I found that it was as follows:—

"The height of the Dane's Castle works, above Pynes, is 150 feet, the length of main being exactly two miles. In the 10" main the theoretical loss of head by friction should be 20 feet, but the pressure gauge always showed a pressure of 225 feet, or a loss of head of 75 feet due to friction; in the 12" main this was not so excessive. On making an examination of the 10" main it was found to be in a very bad condition inside from carbuncles or nodules of oxide of iron, thus presenting a very rough surface to the passage of the water, the diameter of the pipe being also actually reduced to $7\frac{1}{2}$ inches; this main was laid in
1833. The 12" main, which has not been down so many years (laid in 1856), was very bad, though not quite so corroded as the 10".

"In order to ascertain what benefit would be derived if these mains were scraped, the following observations were taken:—The revolutions of the wheels per minute during eleven hours; the depth of the water in the leat; the depth of water over fenders; the pressures upon the pumps as indicated by the gauges; and at Dane's Castle the amount of water flowing over V notches;—these observations were taken on several days and the results calculated are tabulated."

In order to scrape these mains it was necessary to pass a specially-constructed machine though them by means of a pressure of water acting behind the machine on a piston, and I described in detail how I had effected this arrangement. Some awkward bends in the mains which the machine could not pass had to be removed and straightened, and hatch boxes inserted at various points by which the machine could be inserted in the mains. These works occupied about a month before the actual scraping could be commenced.

My report then proceeds as follows:—

"This work having been accomplished, and everything having, as far as could be ascertained, prepared for the scraping machine, I commenced operations on May 5 by placing the machine in the hatch box on the 10" main at Dane's Castle. It will be well here to mention that this hatch box is 6 feet below the surface of the ground, the 10" main being in places more than 16 feet deep. This depth of the 10" main, and uncertainty as to its exact position, rendered the work more than ordinarily hazardous and risky, for it must be remembered that if the machine had stuck in some position not easily discovered, days, or even weeks, might have elapsed before pumping could be resumed, and with only one main at work, Exeter would soon have been without water. In order, therefore, to lessen the risk of losing the machine, I attached a wire tail to it, 240 feet in length, marked at every 10 feet of its length. The benefit of this contrivance was soon put to the test.

"On the valve being turned for the purpose of allowing the high pressure to enter behind the machine, a rumbling noise was heard, and the machine was off. The 10" main, unfortunately, passes directly across a nursery garden, adjoining our works, and as it was thickly planted with young fruit trees of some value, the machine could only be followed with difficulty; the result was that having travelled only for a few seconds the noise ceased, for the machine had stopped, but the exact position could not be determined, although by the help of a long wooden stethoscope the water could be heard pouring through the main. Extra pressure had no effect, so that knowing the machine could not have travelled far, I had the cover of the hatch box removed where the tail was seen, and on measuring the surface of the ground
the pipe was uncovered, when it was found that a length of 12" pipe had at some time been inserted in the 10" main, and, of course, when the machine reached this point, the piston no longer was capable of receiving the pressure of water behind it, and the machine was brought to a standstill. The pipe was cut out, the machine taken out, and a length of new 10" main inserted.

"On May 17 I again inserted the machine in the hatch box at Dane's Castle, and started it at 3.30 in the morning. It travelled very well through the deep part in Howell Road, but on the slight incline just past Duryard Park the machine stopped, and although all the pressure was put upon it that was possible, no movement could be made; the pipe consequently had to be cut, when it was found that 13 large stones had accumulated in the machine and caused it to stop. A few samples of these stones will show how water-worn they are, and how they must have been carried along by the machine some considerable distance.

"The machine was again inserted and the pipe made good temporarily, with india-rubber bands and clips, and the pressure again turned on, but after the machine had travelled only about a hundred yards, one of the joints of the clip gave way, and consequently a new piece of pipe had to be put in; this was done at about 10 p.m., and another start made, but the machine stopped again within about two hundred yards, and could not be moved; as 22 hours had elapsed since the first start, I directed the machine to be cut out the next day, as that night the men were worn out with work. On cutting out the machine on May 18 a wooden handspike (which must have been left in the main when originally laid) was found to be wedged across the machine, completely jamming it against a large piece of lead; the machine was taken out and the pipe made good. As the water in the reservoirs had now got rather low I determined to suspend operations for a short time."

My report then proceeded to state that operations were resumed on June 9, and I described the various stoppages of the machine and the troubles that occurred between that date and July 14, when both the mains had been successfully scraped and the machine was able to travel through in a single journey without a hitch or stoppage. I concluded my report as follows:—

"Both mains were cleared of all foreign obstructions, and in addition to this, many tons of oxide of iron were removed from both mains which had formed on their sides in a remarkable manner; it is impossible to adequately describe the mass of foul-smelling thick black muddy-looking filth which emerged from the hatch boxes and washouts; whilst the scraping was in progress it resembled a black pudding, and was very foul. I produce a sample of this material, which will be seen to be entirely composed of oxide of iron and vegetable peaty matter.
"I am of opinion that more scraping is still necessary, and that it should be repeated about once a year, the cost now would be but trifling, if nothing unforeseen occurs during the operation. The benefit derived from this work is very considerable, friction is reduced, the mains are cleansed, all obstructions are removed, and the exact lines of the mains have been determined. The total cost of the work has been £191 19s.

"I have prepared comparative tables, showing the great increase in the amount of water that can now be pumped without increasing the strain on the pumps at Pynes, a comparison having been made between pressure on the pumps and water delivered, which is necessarily the standard test of effective work. The result of these tables show that about 158,927 gallons per diem can now be pumped into the city in excess of that which could be pumped before the mains were cleansed, and this with a reduction in the pressure of 8 lbs. upon the square inch."

This work was very interesting as the machine could only be used very early on summer mornings and when there was no wind, or traffic, as the only method of locating the machine was by hearing it "grunting" along in a very similar manner to that of a rabbit when about to "bolt." I lost the machine entirely on one occasion as it "raced" too fast to follow. I had, of course, stationed men with flags to wave if it passed them, so I knew it had not passed a certain point. But as there were at least 300 yards of pipe between the two points, the problem was how to find the exact point at which it had stopped. A little reflection, and "pressure" was the answer. Accordingly I had the pipe uncovered a few yards below where the machine had passed, drilled the top of the main, screwed in a piece of pipe to which a pressure gauge was fixed, and when the water was turned on again, the pressure was what it ought to have been. Then another similar excavation and trial lower down, and the pressure here was almost nil. Evidently the machine was between these two points, and at my fifth opening and trial, I came right on to the machine, cut out the pipe, put in a hatch box and all was well. This of course took a long time, as messages had to be sent to the man at the reservoir to turn on or turn off the water as desired. It must be remembered that this work was done before the telephone was on the market, or a "field" telephone would have been invaluable.

I carried out this work about the year 1880, and I have given the above account of a small portion of my work merely as an example of the difficult class of work which falls to the lot of a municipal engineer, and because I believe it was the first time that a water main had ever been cleaned and improved in this manner.
Going back in more chronological order, in the year 1874 I joined the 1st Devonshire Rifle Corps, receiving a commission as a Sub-Lieutenant. I have preserved the formal commission, which is signed "George," the late well-known Duke of Cambridge and "Gathorne Hardy," who was then Secretary of State for War. I did not remain very long in the service, as I found my work and other occupations prevented my giving the necessary time to drills, etc., and I therefore resigned.

One of my brothers had kept a sailing boat at Sea View in the Isle of Wight for some years, and we had often gone short day cruises in her, and had taken part in a good many local sailing regattas, where the White Mouse, as she was called, was generally successful. After I had been at Exeter about a year, he wrote and said that if I would sail the boat from Sea View to Exmouth, he would give her to me. I closed with the offer and went to Sea View on July 23, 1874, having obtained a week's leave for the purpose. There I hired a man and a boy for crew, and we started at 4 a.m. on Friday the 24th. The White Mouse was only an open boat 16 feet over all with a small deck and cuddy in the bows, her rig was a large spritsail, and foresail, with a balloon jib and boom for running, but she had a deep keel and could sail up into the wind like a ten ton yacht. We reached Swanage that evening, after very heavy weather, and slept at the Purbeck Hotel—where the bill was only 13s. 6d. for three suppers, three beds, and three very early breakfasts! Next day we started at 4 a.m. and got to Weymouth about 9 a.m., and then had to get through Portland "Race," which is an awkward place even for large yachts. There was a very nasty and dangerous sea, and it blew half a gale. How we got through I do not know, but we did, and we made Bridport at 3 p.m., where we arrived wet to the skin, as we had broached many seas. The coastguard searched us and the boat for contraband as they thought we had come from the Channel Islands. On Sunday, the 26th, it blew so hard we could not get out, but on Monday, the 27th, we were off at about 4 a.m., and reached Exmouth at 4 p.m. It was a very foolhardy adventure, but I enjoyed it thoroughly. I kept the White Mouse at Topsham, on the estuary of the Exe, for some years, and enjoyed many a sail, single-handed, to Brixham, Torquay, and other places along the coast.

On October 18, 1876, I was married. It is said that there are only three events in any mortal's life, viz. : his birth, his marriage and his death, and I can truly say that this was the most momentous step I ever took, and that it is one that I shall ever look back upon with joy and thankfulness. This book is not written for the purpose
of relating my private affairs, so let me merely add that we have two daughters and two sons and six grandchildren, all of whom have been a blessing and a joy to us.

In addition to being City Surveyor and Water Engineer, my appointment included that of being engineer to the Exeter Ship Canal—said to be the oldest "locked" canal in Europe. Before the year 1260 the tide came up to Exeter and beyond, and the river was navigable for the small craft of that date. Unfortunately, long continued disputes arose between the citizens of Exeter and the succeeding Earls of Devon, until about the year 1510, when a very pugnacious earl constructed rough weirs and dams in the river and completely destroyed the navigation. In the year 1540 attempts were made, and money was spent by the citizens, in endeavours to remove these obstacles and restore the navigation, which all completely failed until 1563, when the matter was taken in hand by "The Mayor, Bailiffs and Commonalty of Exeter," then called "The Chamber," who employed an engineer of the name of John Trew. The latter must have been a very clever fellow, for he determined not to waste money on any attempt to open the river, but to construct a weir across the river at Exeter and to form a canal parallel with the river on the western side. This weir exists and is still called Trews Weir. He thus stayed the current, raised the water to the necessary level, and constructed his canal 16 feet in width, and only 3 feet in depth, but it had three pools or locks in its length of nearly two miles, which were 23 feet in width, and nearly 200 feet in length. Why he considered it necessary to make them of this large size is a mystery. They were fitted with gates and had a lift of about 2 feet 6 inches of water, and were "Pound locks" similar in principle to those of to-day. In 1675 the canal was widened to 50 feet, deepened to 10 feet and somewhat extended. These works took twenty-five years to complete, and were then far from satisfactory, as might be imagined. In the year 1820 a Mr. James Green, M.Inst.C.E., was employed to advise on this canal, and he eventually carried out very considerable alterations and improvements. The canal is now 15 feet in depth, 60 feet in width, and 5½ miles in length, with a lock at Turf, the sea end of the Canal, another lock about half way towards Exeter, called Double Locks, and other sluice gates, bridges, etc. As a work of that period it was a great feat of engineering, as most of the canal is built up above the surrounding ground, which gives a most unstable foundation. The lock at Turf was constructed on piles.

This canal gave me considerable trouble to manage and maintain, as the old cills and gates of the locks were in a bad and leaky-
condition. As early in 1874, soon after I had taken up my appointment, I was obliged to carry out extensive repairs to the gates at Double Locks. I also prepared plans and estimates for new gates at this lock, but it was not till late in the year 1880 that the Council decided to allow me to put these works in hand.

As the proposed works were extensive and time was of great importance owing to the interruption of the navigation whilst the work was in progress, I undertook to execute the whole work within a period of one month. The first thing was to construct the new gates, alongside the lock, ready for launching, and on August 1, 1881, I commenced putting in the necessary coffer-dam and the work proceeded. Unfortunately, after I had pumped out the water, I found that the wooden cill of the lower gates was absolutely rotten and I had to put in a new cill. I also found other defects which were only revealed as the water was pumped out and consequently much more work had to be done than I had anticipated. But notwithstanding this, the work was finished and navigation resumed on September 3, so I practically kept my promise.

Whilst the work was in progress, I used to be on the job every morning at 6 a.m., and never left it till it was too dark to see. It was an anxious, arduous month, as of course I had to do my ordinary work as well in a small temporary office on the works, but the sixteen hours a day, including Sundays, did me no harm. It is worry that kills, not work.

In hard winters the ice gave a great deal of trouble in the canal, as of course the water had to be kept open for navigation. We had an iron ice-boat—for the purposes of breaking up the ice—which was towed by horses and about six men in the boat kept rocking it from side to side, whilst a man in the bows smashed the ice with a crowbar. The winter of 1880–81, was very severe, and the cold was so intense that not only did the canal freeze, but also the River Exe itself with ice three or four inches thick. Then came rain and a thaw, with the result that the ice above Exe Bridge began to break up, and as the ice below the bridge remained solid, the ice packed against the up side of the bridge to an alarming extent. The bridge was a very old one (since rebuilt) and fears were entertained for its safety owing to the enormous pressure of the packed ice, which rose to within about a foot of the top of the parapet, and almost completely blocked the water way through the arches. There was also considerable danger of a serious flood if the arches of the bridge could not be cleared. I tried hard to move the block with long scaffold poles, but without success.

What was to be done? The ice boat had been frozen in,
about the middle of the Exe, a few yards below the Bridge, and Mr. Donald Cameron,¹ my chief assistant, volunteered to cross the ice with a rope, and see if he could not break up the ice below the bridge. Three men followed him, and they all succeeded in reaching the boat. We, on the shore, hauled on the rope, they meanwhile rocking the boat and smashing the ice, and presently the whole mass of ice began to move towards the weir only a few hundred yards below the bridge. This was a critical moment, as boat and ice were moving together and if the boat reached the weir, Mr. Cameron and the men would inevitably have been drowned. To haul too vigorously on the rope might have broken it, but with gradual coaxing we managed to get the boat to the shore only a few yards above the weir. They were very anxious minutes, but the situation was saved, the ice rose in majestic slabs as it reached the weir and toppled over, the river began to get free, the ice blocking the bridge began slowly to pass under it, and all was well. I received the formal thanks of the Council in the following letter from the Town Clerk:

Exeter.
February 14, 1881.

DEAR MR. SURVEYOR,
I am directed by the Town Council to convey to you this expression of their sense of the valuable services rendered by you on the breaking up of the ice on the River Exe on January 27, 28 and 29, and to express their best thanks for your strenuous exertions, to which, in the opinion of the Council, the avoidance of a dangerous flood is largely to be attributed.

The Council further desires me to express their entire satisfaction at the way in which all those employed under you discharged their duty at a most critical time and frequently at the serious risk of their lives.

Yours truly,
(Signed) BARTHOLOMEW C. GIDLEY,
Town Clerk.

Most unexpectedly I also received the following letter from the Exeter Charity Organisation Society:

Exeter Charity Organisation Society,
February 14, 1881.

DEAR SIR,

On the other side I send you an extract from the report adopted at the Meeting held at the Guildhall on the 8th inst. I have very great

¹Mr. Cameron succeeded me as Surveyor of Exeter, and became afterwards well known through his discoveries in connection with the septic treatment of sewage.
pleasure in conveying to you the hearty thanks of this Society for your energy in practically carrying out the suggestions, not only in clearing the snow from the streets, but also in preventing the accumulation of ice in the river which might have produced a most disastrous flood.

Yours faithfully,

(Signed) R. H. DYMOND,
Hon. Secretary.

It is always a satisfaction to a public official to receive any thanks for services he may have rendered to his fellow-citizens, as unfortunately too often they are more predisposed to criticise his actions without careful consideration as to how far his efforts may have been controlled, or hampered, by his Council or by a committee.

Another rather unpleasant recollection I have is of serious flooding in a part of Exeter known as the Longbrook Valley, through which a sewer of considerable size passed, draining a large area. I forget the exact year but think it must have been about 1875 when continuous rains had filled the sewers and soaked the land, followed suddenly by a very heavy rainstorm with the result that this portion of the valley became flooded. It was about 9.30 p.m., and I had been dining out, when I was fetched in a hurry by one of my assistants. I rushed off in my dress clothes to the spot, where I found that already the water was several feet deep in the adjoining houses and was still rising. There were people screaming for help in the upper windows, and it was altogether a weird scene. Some of my men were quickly summoned, and we began to rescue the people by wading in and carrying them bodily to dry land. I realised then why it is that fire so often follows flood, for in many of the houses, lamps and candles were still burning on the tables which had floated, and as the water rose they were getting gradually nearer and nearer to the ceiling, which, when reached, would have taken fire.

When all had been rescued I turned my attention to relieving the flood if possible, and happily remembered that there was an auxiliary sewer, which should have taken some of the water through the gullies, which had, however, become choked by the first rush of the water and débris. There was a manhole with a stone cover in the roadway, but there were several feet of water then covering it. One of my masons, unfortunately a very short man, said he could find it and stepped out to do so. We had been more than up to our waists on the footpath, which was raised by a double kerb above the road, and when he stepped off he practically disappeared. If I had not clutched him and got him back I think
would have been drowned. With the help of some large slabs on which men could stand, we eventually sounded with bars till the stone cover was found; it was raised with great difficulty and the water rushed in, and in a few hours the flood had abated. I was practically out all night in my dress clothes and soaked to the skin, but so far as I remember took no harm.

The whole of the sewage of Exeter drained through many outfalls into the mill leats or direct into the river, and I was instructed to prepare a scheme for diverting these outfalls, and either carrying the sewage into the tidal waters, or dealing with it in some other manner.

It was in the days when the leading sanitarians raised the cry of "Sewage back to the land," and I prepared a scheme in 1874 on these lines. My proposals were, shortly, to carry a low level sewer along the foot of the city, to cross the River Exe by means of a syphon, pass behind the canal basin, and follow the line of the towing path on the western side of the canal and discharge at a point 3 feet above low water at spring tides in the gutway or channel leading to Turf Lock at the end of the canal. Along the line of this outfall sewer, arrangements were to be made to tap the sewage at suitable points for the purpose of irrigating the meadows on that side of the canal, of which 700 acres were available for the purpose, and if necessary by means of a syphon under the canal, a much larger area of land could be commanded on the east side. The weak points of this scheme were, that I could only get a fall or gradient of three feet in a mile for my outfall sewer, about five miles in length, although I could easily arrange for flushing points along its entire length from the water in the canal, and there was also the danger of disturbing the canal banks in constructing the sewer as these banks were not in a very stable condition.

As a broad land irrigation scheme it had merits, as the population to be sewer was only about 30,000 and the 700 acres of land that could be treated meant only 43 people to the acre, but it was not proposed to purchase the land but to give facilities for the occupiers to use the sewage as required. This was another weak point in the scheme, as if the sewage was not thus used it would have discharged into the channel or gut at Turf, which might have silted up in consequence.

On the whole, therefore, it was as well that the Council did not approve the scheme, but eventually carried out a much better scheme of bacterial treatment designed by my successor, Mr. Donald Cameron, about fifteen years later.

Amongst numerous other works that I carried out whilst at
EXETER

55

Exeter was the conversion of the old gas works in Exe Island, a district in the lower part of the city, into a public abattoir. When these gas works had been originally constructed I do not know, but they must have been fairly old as two gasometers had been constructed under a brick building with a substantial roof to protect them against fire! This building I converted into a sheep and pig killing department, and the retort house into the main slaughter house. The conversion of existing buildings into something else is always a rather difficult job, but extremely interesting, and this slaughter house, completed in the year 1881, is still existing and has been a great success.

Whilst the buildings were in process of reconstruction during 1880, the Royal Sanitary Institute, then called the Sanitary Institute of Great Britain, were invited to hold their annual congress in Exeter, and a difficulty arose as to where their Sanitary Exhibition would be held. There was no suitable building in the City, and I suggested that these old gasworks could temporarily be adapted for the purpose. The suggestion was approved, and I set to work to make them available and the exhibition was held there with great success. Unfortunately Exe Island was not a very attractive quarter, but the City Council agreed to allow me to make it more attractive with trees in barrels, etc., and I converted a very shabby sort of square into a most attractive garden, for which I got great kudos.

The congress at Exeter was the fourth that the Sanitary Institute had held since its formation, those previously held having been at Leamington, Stafford, and Croydon. The late Earl Fortescue was the president, and amongst other well-known sanitarians of that date who attended the Congress were Mr. Edwin Chadwick, Mr. Robert Rawlinson, chief Engineer of the Local Government Board, Dr. Alfred Carpenter, Dr. Benjamin Ward Richardson, Mr. Henry C. Burdett, well known for his interest in hospitals, Sir John Lubbock, Professor Corfield, Professor de Chaumont, Mr. William Eassie, the cremation enthusiast, Mr. Rogers Field, Captain Douglas Galton, Mr. H. Saxon Snell, Mr. G. J. Symons, the meteorological expert, and other well-known men of that day, many of whom received titles before passing over to the great majority, which they all have done.

The Institute had just started examinations for local surveyors, and although at one of the public functions I told them they were not the right body to hold such examinations, I said that I would submit myself for examination, which I did in November of the same year and happily passed. The viva voce was rather formidable,
as one sat in front of the whole board of examiners, who then consisted of the following sanitary experts:

H. C. Bartlett, Ph.D., F.C.S.
Alfred Carpenter, M.D., S.Sc.
F. S. D. F. de Chaumont, M.D., F.R.S.
W. H. Corfield, M.A., M.D., F.R.C.P.
W. Eassie, C.E., F.L.S.
Rogers Field, B.A., M.Inst.C.E.
Captain Douglas Galton, C.B., R.E., F.R.S.
W. H. Michael, Q.C., F.C.S.
Ernest Turner, F.R.I.B.A.

One felt like a rabbit in front of a nest of boa-constrictors waiting to devour one. I remember that I was very severely "cross-examined" about ventilation, a subject about which I still confess some ignorance, as it bristles with difficulties between the avoidance of draught, and sufficient air at a proper temperature. "Natural man abhors ventilation," as someone remarked in the "House" one evening when the subject was under debate, and there is hardly a law court or public building existing where there are not sometimes complaints either of the lack of ventilation, or a draught. This reminds me of a story of someone at a large meeting who stood up and called out, "Is there a Christian scientist present?" A man in the body of the hall stood up and said, "I am," whereupon the inquirer said, "Do you mind changing places with me; there is such an infernal draught here?"

I was elected an Associate Member of the Institution of Civil Engineers in 1874, and a full corporate member in 1878. I also became a Member of the Sanitary Institute in 1880, and a Fellow of the Royal Sanitary Institute in 1888, when the Institute was reconstructed. There were some very interesting and well known sanitarians in those days who I can well remember as I used to frequently meet them. There was Sir Edwin Chadwick, the great sanitary reformer, with his huge white forehead and long black hair plastered down over his ears. Then there was Sir Robert Rawlinson, full of his doings at the Scutari Hospital during the Crimean War, and of how he poked his walking-stick through the closed windows of the hospital with the remark, "That is what you want, fresh air and nothing else." It was almost a certainty that, during Sir Robert's later days, he would relate this story at every after-dinner speech he gave. There was also Sir Benjamin Ward Richardson, with his splendidly optimistic views of the city of Hygiea and the prolongation of human life to at least 120 years. Nor can I forget
that eminent water engineer, Sir Thomas Hawksley, who, though at an advanced age, was an example of industry and thoroughness to younger men. I was engaged with him in a riparian rights case a few years before his death, and he took notes of the evidence and proceedings as keenly as if he had been a young man commencing his practice instead of an old man very near the end of it.

Shortly after I had joined the Sanitary Institute I became a member of the Board of Examiners. The examination of surveyors had then been dropped, and only candidates for certificates of fitness as sanitary inspectors were examined. Many of the candidates who presented themselves for examination were quite untrained in the smallest rudiments of sanitary knowledge, and we used to get the most extraordinary answers both in the written papers and also in the *viva-voce* examinations. I kept at one time a record of these peculiar answers, and it is almost impossible now to realise how completely ignorant these candidates then were. I will give examples of a few of these answers which I recorded, as some of them are astonishing, if not amusing:

**Q.** What is a death-rate?

**A.** "A death rate is a rate levied on the living to support the dead."

**Q.** How is portland cement manufactured?

**A.** "The right way to make portland cement is to grind up portland stone."

**Q.** What is a common lodging-house?

**A.** "A house where people, not of the same family, sleep together under the control of the local authority."

"The law says a common lodging-house is a house in which the poorer classes are received, and although strangers to each other, may be allowed to inhabit in the same room."

"A common lodging-house is a place where a person can get a night's lodging or more."

**Q.** What is commercial carbolic acid, and what is it used for?

**A.** "Commercial carbolic acid is used by commercial people on their entering different dwellings in their travelling intercourse with the public especially for their safety in sleeping apartments in different hotels and lodging-houses."

**Q.** What are the parasites in a human body?

**A.** "Fleas, bugs, and lice, but they won't do you any harm unless they are disturbed."
Q. In what way does cholera spread?
A. "Cholera spreads through air, as a proof if you fly a kite with a piece of meat attached it turns black. Also by flying lights." (This is a peculiarly cryptic answer.)

Q. What would you do with the patients' clothes, bed linen, etc., if called into a house where there was a case of infectious disease?
A. "I should throw everything out of window." Another candidate said that "a precaution in smallpox is that the patient should be given an old rag for his own use." Another candidate of a more bloodthirsty character said, "I should give the patient a daily bath of corrosive sublimate"! and another, "Members of a family where smallpox has broken out must be sent to a hospital and well boiled"!

I should only weary my readers if I gave many more of these curious answers, but the following are, I think, worth quoting; the questions, which may be inferred, being omitted:—

"The tops of soil pipes should be covered to prevent rain getting in."
"Dry houses are more cheerful as in damp ones the inmates must be continually mourning the loss of something in the shape of a death."
"If a corpse has died from an infectious disease and finds himself without proper accommodation, he can apply to a magistrate to be removed to a mortuary."
"If water had been contaminated with the excretion of cholera patients, it would raise the suspicion that the water was polluted."
"Many articles of food have to be adulterated in order to keep them pure."
"Cesspools must be constructed of incombustible materials."

The last I venture to give is a gem:—

"Persons suffering from an infectious disease must not ride in any conveyance except a hearse without first informing the driver."

I am still a member of the Board of Examiners, but we never get such amusing answers nowadays, as the candidates are all well-trained and coached, and do not now come such delightful "howlers."
Amongst my other experiences, whilst at Exeter, I became a freemason, and eventually worked my way up to being Master of St. George's Lodge, No. 112, and have some very happy recollections of my brother masons, and of the refreshment which followed labour. I also indulged in a little literary work for various magazines, and read papers at the meetings of various professional institutions, and I wrote a little pamphlet, or book, called *Dirty Dustbins and Sloppy Streets*, which was published by E. & F. N. Spon. This book dealt with almost everything connected with scavenging and the disposal of refuse, street watering, the removal of snow, etc., and was very well received and reviewed by the technical press. It was an absolutely new subject, no other work of the kind ever having been previously produced, and one of my reviewers quoted from Coleridge's *Ancient Mariner*, and said of me—"He was the first that ever burst into that silent sea."

When I became Surveyor of Exeter the great Public Health Act of 1875 had not been passed, and consequently we found some difficulties in either enforcing or in keeping "within the law," as clauses relating to sanitation, etc., were buried in a multitude of Acts dealing with other subjects, and not easy to find. There were no special text books dealing with the work of municipal engineers, and consequently about three years before I left Exeter, viz.: in the year 1880, I began to write a book on the subject, *The Municipal and Sanitary Engineers' Handbook*, which was published in 1883 by Spon. It took me nearly all my spare time, of which I had very little, to get together the necessary information to write this book, and many of the chapters were written and revised five or six times over before I was satisfied, but as some American writer once said, "A book that is easily read has been hardly written," and looking at my book to-day, I can honestly say that there is not a single "slipshod" sentence in it. I wonder now how I could have had the courage and perseverance to write it. This book had a large sale and speedily went through three editions and it is a great reward to me when I meet municipal engineers even to-day who tell me what a help it was to them in the early part of their career, and that it is even so now.

Early in the year 1883, the appointment of borough engineer of Portsmouth became vacant, and as I saw greater chances of "honourable advancement" at a go-ahead place like Portsmouth, I applied for the berth and succeeded in obtaining it. I was supported in my application by very excellent testimonials from the Mayors of Exeter during my years of office, amongst them being the following well-known men of Exeter in those days, viz.:—
Sir,

Having heard that you are applying for the situation of surveyor of Portsmouth, I volunteer to write you a testimonial on my own account to be used if you think it of the least service.

I know of you only in your public capacity, but in that capacity I think you have been most efficient in Exeter and have carried out great improvements in the modern spirit.

I was for more than 30 years and, until the merger of the Body of Improvement Commissioners in the Town Council as the urban sanitary authority, a member of the former body, and was previously also a member of the Town Council for many years, was mayor for two years, and having taken an active part in public business during those times, I consider myself fairly entitled to give an opinion of your efficiency in the service of the latter body though I have not belonged to that body during the time of your service.

I write you this entirely on public grounds and unasked.

Yours truly,

(Signed) John Daw.

I was naturally exceedingly pleased with such an unsolicited testimonial, especially from an old man who was a remarkably shrewd and able solicitor, very highly respected by his fellow-citizens.

On leaving Exeter I was presented with a large and beautiful silver candelabra with cut glass dishes for fruit, with the following inscription:—

"Presented to H. Percy Boulnois, Esq., M.Inst.C.E., on his leaving Exeter, by his friends as a mark of their appreciation of his professional ability and personal worth."

I gave a farewell supper to all the Corporation workmen under me, a few nights before leaving, and I believe I left many friends who regretted my departure as much as I did leaving them.

However, "Excelsior" should be everyone's motto, and although the proverb says that "a rolling stone gathers no moss," on the other hand, it may gain experience, which is of far more value.
CHAPTER VI

PORTSMOUTH

On April 3, 1883, I was elected Borough Engineer of Portsmouth by 43 votes to 5, and I took up my appointment on May 5 of that year. I found the work at Portsmouth very different to that which I had left at Exeter. The area was much larger, and almost entirely a dead flat, whereas Exeter was very hilly. The waterworks belonged, and still belong, to a private company so that I had nothing to do with water engineering any longer. There was no canal, except a short length of a derelict one, that had never held water, after being constructed during the canal mania many years before. But there was a long sea front, and Southsea Common, which in those days was in a very rough and neglected condition. I found that a very big sewerage and sewage disposal scheme was in hand which was being carried out by Sir Frederick Bramwell, so that I had very little if anything to do with that. I found also that the War Office, and the Admiralty, had a good deal to say before any improvements could be carried out. I had an instance of this some little time after my appointment, when the Commanding Royal Engineer of that date said to me one day, "Mr. Boulnois, you lay a good many eggs, but they are not all hatched." In reply I said, "I'm afraid, sir, that is because you sometimes addle them."

However, I must say that the Government officials were nearly always extremely helpful whenever a proposal was not in any way inimical to the naval and military requirements, although at times my suggestions for improvements must have been somewhat trying to them.

The sea front had no promenade and to pass between Southsea Castle and the sea required considerable agility and was not unattended with some danger of slipping into the sea. One of the first works which I had to carry out was the construction of a paved promenade along the whole sea front, with a road between this promenade and the common. Towards the eastern end of this promenade the sea, when rough, used frequently to dash the shingle on to the promenade and road, and it was a costly job in labour to remove it. By erecting a low concrete wall with a continuous seat facing the sea, I prevented the shingle falling on the road, and as
the promenade between this low wall and the sea was of concrete, it became an easy matter to sweep the shingle back on to the beach when this occurred.

Amongst other works which I found in progress and had to finish was a new custom house at the Camber Docks, the old building having had to be removed for some widening improvements in that congested locality. The plans had been prepared by H.M. Office of Works, and I found considerable difficulty in interpreting these plans, which were only drawn to an $\frac{1}{8}$" scale, and all the detail drawings and specification had to be prepared by me. However, I succeeded in carrying out the work to a successful conclusion after considerable difficulties. The foundations were found, when excavated for the work, to be of a boglike character, which obtains in this neighbourhood, and no provision had been made in the original scheme to meet this contingency.

The public swimming baths were also in progress and were finished by me with some additions thereto. As some trouble arose soon after my appointment as to what was the real area of certain parts or portions of the Borough of Portsmouth, the total area of which was 4,320 acres, I carefully took the areas from plans in the possession of the Council and surveyed other areas, with the result that I found the areas were as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Acres</th>
</tr>
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<tbody>
<tr>
<td>Land wholly built over in Landport and Southsea</td>
<td>1179-00</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; Portsea</td>
<td>79-50</td>
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<tr>
<td>&quot; &quot; &quot; &quot; Portsmouth</td>
<td>56-00</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; Milton</td>
<td>32-00</td>
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<tr>
<td>&quot; &quot; &quot; &quot; Eastney</td>
<td>28-00</td>
</tr>
<tr>
<td>Total thickly populated areas...</td>
<td>1374-50</td>
</tr>
<tr>
<td>Dockyard and Gun Wharf</td>
<td>317-00</td>
</tr>
<tr>
<td>Government property</td>
<td>110-50</td>
</tr>
<tr>
<td>Various quays at Portsmouth, and Flathouse, etc.</td>
<td>14-75</td>
</tr>
<tr>
<td>Recreation grounds of the United Services</td>
<td>30-50</td>
</tr>
<tr>
<td>Southsea Common and Minnow Pond</td>
<td>150-00</td>
</tr>
<tr>
<td>(This Minnow Pond, which was really an ugly swamp, was afterwards converted by me into an ornamental canoe lake.)</td>
<td></td>
</tr>
<tr>
<td>Roman Catholic cathedral and grounds</td>
<td>2-75</td>
</tr>
<tr>
<td>Victoria Park, playground, library, etc.</td>
<td>17-50</td>
</tr>
<tr>
<td>Bogland at Southsea partially built upon</td>
<td>47-00</td>
</tr>
<tr>
<td>East Hants recreation ground</td>
<td>6-00</td>
</tr>
<tr>
<td>Total</td>
<td>2070-50</td>
</tr>
</tbody>
</table>
The above figures are interesting as a record, and if compared with similar figures to-day would be found to have varied considerably with regard to the area built over, as during my term of office there passed through my hands as building surveyor many hundreds of plans of thousands of houses which were erected under the superintendence of my staff. I find from one of my notes that in three years, no fewer than 1,277 sets of plans passed through my hands, representing the erection of 3,025 new dwelling-houses and 636 miscellaneous buildings.

With regard to my staff, it may be interesting to note that when I was appointed in 1883, the staff consisted of an assistant engineer, a surveyor and leveller, an inspector of private house drainage, an inspector of private street improvement works, and a clerk. I also had two pupils, which made up the whole of the indoor staff. There was also a road foreman, stable foreman, store keeper, and various other foremen or gangers, and an inspector of sewers. It is interesting to see by my notes that the foreman of bricklayers received only 9d. per hour and the ganger of sewer flushers 4s. 6d. per day. The following list of wages then paid for a day of ten hours may also be of interest when compared with present rates of pay:

Paviours, masons, bricklayers, all 5s. a day; excavators 3s. 6d. to 4s.; labourers, 3s.; scavengers, 2s. 4d.; horse drivers, 3s.

I wonder what the trades unions of to-day would have to say to such wages.

With regard to the prices of materials, it may be interesting to record from a few notes that I have of these, what the prices were in or about the year 1883, as the present generation of surveyors, and those to serve in the future, would, I feel sure, be interested in comparing them with the ruling prices of their time.

I find for instance that agricultural drain pipes of 3 inches internal diameter, one foot in length, were 4s. per 100, 4 inches were 8s., and 6 inches were 16s., and 9 inches, 50s. Concrete pipes, 18-inch internal diameter, 2s. 5d. per foot, delivered at Portsmouth station; 21 inches, 3s. 3d.; 24 inches, 4s. 5d.; 27 inches, 5s. 3d.; and 36 inches, 8s. 9d.

Portland cement concrete, in situ, from 10s. 6d. to 12s. 6d. a cubic yard. Dredging in the harbour and barging away 2s. 6d. per cubic yard.

The prices of paving materials delivered at Portsmouth station were as follows:

Purbeck "marble," 3s. 1rod. per square yard. Blue pennant, 4s. 1rod. Caithness, 6s. 1d. Keinton, 5s. 6d. Blue bricks from rs. 9d. to 2s. 6d. Buff bricks, 2s. 3d. Artificial concrete flags,
from 4s. 6d. to 5s. 6d. Tar pavement from 1s. 5d. to 1s. 10d. Limmer asphalte, 4s. 6d. Southampton gravel, 8d.

In connection with artificial flag paving, when I first went to Portsmouth, the Corporation were laying large quantities of an artificial flagstone made in the town. This was called "Ferrumite" because the surface had a small percentage of iron filings combined with the granite chipping matrix, which was supposed to add to its wearing capacity. The cost of these flags laid in the streets was about 5s. 6d. a square yard.

I very soon induced the Council to allow me to make our own artificial flags at one of the Corporation yards, and I find amongst my notes the following particulars of their cost of manufacture:

- Five bags of cement—10 bushels at 2s. ... ... 1 0 0
- 1 cube yard granite chippings at ... ... 0 10 8
- 1 cube yard beach shingle, at ... ... 0 6 0
- Soft soap and sundries—say ... ... 0 1 0

Total ... £1 17 8

4 days' labour at 3s. 6d. a day ... ... 0 14 0

Plant, waste, rent., etc., say ... ... 0 5 0

Total ... £2 16 8

The above quantities made 36 slabs of 3 feet 9 inches super, each 2 inches thick, which thus cost 3s. 9d. a square yard. Thirty-six slabs could be carried in one cart load, and the cartage and laying, including bedding on mortar, cost another 9d. a square yard or 4s. 6d. per square yard laid complete, a saving of quite one shilling per yard on contract prices. One more instance of costs, or prices, before I pass on to other matters.

The Corporation kept a large stud of cart horses, over which I had control, as we did all our scavenging, road cleansing, and other work with our own staff, and I find that the keep of a horse per week in the year 1887 was as follows:

- 2½ bushels of oats ... ... 6 7½
- 14 lbs. bran ... ... 7½
- 112 lbs. hay ... ... 4 6
- 56 lbs. straw for litter ... ... 1 3

Total (per week) 13 0
I doubt if horses will ever be kept as cheaply again in this country, and they were very fine animals indeed, and did a long day’s work.

One of the largest and most important engineering works that I can remember having carried out at Portsmouth was the increased wharfage accommodation at the Flathouse wharf. It was really a jetty projecting into deep water, and was constructed of concrete, faced with Portland roach and Purbeck stone, with a heavy granite coping. This gave an additional 800 feet run of wharfage face and an extra quay area of 3,530 square yards. The wall was about 35 feet deep, which allowed a vessel drawing 28 feet of water to lie alongside. As the foundations of this wall was on what was locally known as the Slipper Clay, the toe was protected by 12 inch by 12 inch baulks driven close together as deep as they could be driven. A travelling crane on rails was provided which ran along the whole face of the new quay or jetty.

I also carried out many miles of arterial sewers and reconstructions, as well as the sewerage of the whole of a district in Portsmouth known as Stamshaw, with a separate pumping station, but there are no special features with regard to this work worth recalling.

I also constructed the canoe lake at Southsea. This was previously a sort of morass into which rubbish was occasionally tipped and was a great eyesore. There was, I think, only one other salt water artificial lake of this kind then existing, which was at Ryde, in the Isle of Wight. Rather curiously there was strong opposition to the scheme at the Local Government Board Inquiry, which of course had to be held previous to the construction of the lake. This opposition was organized by an eminent retired Royal Engineer general, who objected on the ground that the sea was quite near enough without bringing it nearer to the houses! The result was a curtailment of the size of the lake, which was to be regretted, and it may be interesting to observe that after the lake had been constructed and surrounded with ornamental grounds, this gentleman, on meeting me one day, expressed his pleasure at its completion, and congratulated me on the great improvement I had effected. One would have thought that so eminent an engineer could have seen from the plans what would be the result when the scheme had been completed.

This description of criticism is one of many worries with which a municipal engineer has to contend. No one likes to interfere with the Town Clerk or his legal advice, as very few people think themselves lawyers; very few interfere with the medical officer of health, as they do not pretend to know much about the intricacies
of his work, but in the case of public works, especially when they are in progress and partially completed, nearly every citizen feels he is a competent critic, and all sorts of suggestions and criticisms are made to the Surveyor and also appear in the public press. On one occasion I remember I was improving, and intending to plant out, a large area at the intersection of some important roads, and a rumour was spread, when I had fixed some of the iron fencing for the beds of shrubs, that I was erecting sheep pens and intended to convert this area into a live stock market! There was a great outcry and condemnation of the Surveyor and his project until explanations were forthcoming and the work was completed to the satisfaction of everyone.

Whilst at Portsmouth I was subjected to a good deal of friendly criticism from service men of my acquaintance. I can recall two instances of this. One of them was in connection with the canoe lake, as I erected in connection therewith a very tall flagstaff with a weathercock on the top. I took special care myself to see that the north point was correctly placed, and set it out personally both with the compass and also by the sun at noon (Greenwich time). A friend of mine, an admiral, met me one day near the spot and declared I had set it up wrongly, till I ventured to remind him that where we were standing there was a slight difference between magnetic and true north, when he was soon satisfied that I was right.

Amongst other improvements which I carried out along the sea front was the re-arrangement of the various monuments, trophies, etc., which had previously been more or less scattered along the beach. Amongst them was discovered the large anchor of the Victory, and I designed and erected a granite base on which the anchor was placed. This base had four tablets with appropriate inscriptions of which I was the author, and one of which reads:

"Near this memorial on the 14th September, 1805, Admiral Lord Nelson embarked for the last time, being killed on the following 21st October, at the victorious battle of Trafalgar."

Soon after the erection of this monument a friend of mine met me, and said, "Hullo, isn't he dead yet?" I enquired to whom he referred and he said, "Nelson." I assured him he certainly was dead, but he then said, "Your monument says he is 'being killed,' which was true, but I did not have it altered and the words stand there to this day a living memento of my want of literary merit.

After placing the anchor on its base, it looked rather bare, so I obtained a length of very heavy anchor chain and wreathed it
round the shaft, and stock, which gave it a very pleasing effect, but it was not there many days, as another candid naval friend observed to me, "Do you know that in the days of the Victory, anchor chains were unknown and only huge hawsers were used?" I at once knew I had been guilty of an anachronism (I nearly wrote anchorism) and the chain was at once removed and the anchor has gone bare ever since.

In the year 1884 I prepared a scheme, which was accepted by the Council, for supplying sea water to the public swimming bath, and also for street watering and sewer flushing, and eventually carried it out after a good deal of preliminary opposition.

In order to avoid the expense and unsightliness of a water tower, or standpipe, I prevailed on the War Office to allow me to fix a tank on the semaphore tower at the bottom of the High Street, Portsmouth. This tower is said to have been the Governor's house in early Tudor days, and had served many War Office purposes since that date.

The opposition alleged that the use of salt water on the roads would seriously affect the varnish on the wheels of carriages, that it would cause the water and gas mains to rust, that it would kill, or injure, the trees planted at the edges of the footpaths and be highly detrimental to steel, plated goods, and other articles, in the shops adjacent to the street so watered.

I overcame the first objection by testing varnished carriage wheel spokes with sea water in a variety of ways, without the slightest bad results. I proved that the mains were at sufficient depth not to be affected by surface sprinkling; that trees and shrubs grew close to the edge of the sea and were unaffected thereby, and that as to goods in shop windows, some of the best shops at places like Brighton, Hastings, etc., had existed for years on the sea front and were constantly exposed to sea spray and vapours. When I proposed to use sea water for sewer flushing, I was met by arguments that the effect would be to set up decomposition and consequent smells, and other far-fetched criticisms, but I argued that nothing of the sort would occur, but that on the contrary the specific gravity of salt water was higher than that of fresh water and consequently the sea water would sink to the bottom of the sewers and thus tend to cleanse them. Eventually the opposition collapsed and I carried out the scheme successfully, and the beneficial results exceeded my expectations. I found that about two street sprinklings with sea water were more efficacious and more lasting in their effects than three street sprinklings with fresh water, and that no ill effects followed to either carriages, goods, or trees. Sea water, however,
is better adapted to gravel roads than granite macadam roads, as with the latter the effect after some time is apparently to bind the surface, and even form a sort of skin on the road, which at times is a little slippery for horse traffic, whereas on gravel roads this effect is not produced. In connection with sewer flushing, it is rather interesting to note that the swimming-bath emptied through a 12-inch pipe, into a 3 feet by 2 feet 3 inch brick sewer. The bath held 72,000 gallons of water and the 12-inch pipe discharged full bore into this sewer, which had a gradient of about 1 in 300. I carefully noted the effect of this flush on the sewer, and though I cannot find the figures, I know I was struck with the small flushing effect this large volume of water had on the sewer. Owing to the action of gravity, the effect of the flush seemed to die away altogether in a distance of about 200 lineal yards. From this I learnt that flushing sewers for small distances, and with less quantity of water, is better than trying to flush a long length of sewer with a large quantity of water.

With reference to this question of flushing, I find amongst my notes a table prepared by Mr. Rawlinson, when he was chief engineering inspector of the Local Government Board, as follows:

<table>
<thead>
<tr>
<th>Diameter of Pipe</th>
<th>Number of Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 inch.</td>
<td>35 galls.</td>
</tr>
<tr>
<td>9 inches.</td>
<td>80 &quot;</td>
</tr>
<tr>
<td>12 &quot;</td>
<td>140 &quot;</td>
</tr>
<tr>
<td>18 &quot;</td>
<td>320 &quot;</td>
</tr>
<tr>
<td>24 &quot;</td>
<td>570 &quot;</td>
</tr>
</tbody>
</table>

How these cryptic figures were arrived at, or whether any municipal engineer has acted on them, I do not know, but it is interesting that I should have preserved them for so many years though I am doubtful if I ever myself acted on them, as they must vary considerably with the gradient of the pipe proposed to be flushed and in my opinion are consequently valueless.

Amongst other miscellaneous work which I carried out was the laying out and planting of a large recreation ground at North End, which involved the construction of a bicycle racing track—of which very few had then been constructed in this country. At one end I was obliged to make a rather sharp curve about 2 ½ chains radius, and my difficulty was to estimate the correct elevation for the outer edge of the slope. In the end I took a tricycle as my gauge and a speed of 25 miles an hour, and worked at the slope on that basis, with the result that the slope when finished looked far too
steep, though subsequent events showed that if anything I had under-estimated it.

I had a good deal of work to do at one time in the way of coast protection, as may be supposed, and soon came to the conclusion that it was no use "fighting" the sea, tides, currents, and winds, but that the only way to get shingle or beach to "grow" where it was wanted was to "nurse" it into place, i.e., to watch the effects of certain movements of beach, find out why at certain times there was a famine of shingle or sand at one point, and a surplus at other points and then begin the construction of a groyne about the level of half tide and build it up or down as the shingle showed a disposition to collect. I did this long before the late Mr. Case had studied this question very carefully, and became an expert on the matter, and was consulted on the subject by a large number of local authorities. There must have been a great deal of money often wasted in this fight against the forces of nature in the past, and I fear that in some instances this is being continued.

It would be only wearisome to give any sort of list of the various works and improvements I carried out, suffice it to say that the work was very varied and added a good deal to my stock of professional knowledge and to my experience, that it was exceedingly interesting, and that I thoroughly enjoyed it. The only fly in the ointment was that the Council committees met always in the evening, which was very trying after a hard day's work, especially if, as sometimes occurred though not very frequently, there were "wigs on the green," when one would go home about ten o'clock at night thoroughly exhausted.

I have come to the conclusion, after a somewhat long and varied experience of municipal work, that a surveyor is one of the few men who know what real hard work means. Personally I have on frequent occasions worked for 15 or 16 hours a day, and kept it up for some weeks. Such an official must, therefore, be of a somewhat strong constitution to start with. He must not only thoroughly understand the work of his profession, but be full of resource in time of difficulty, and above all he must be tactful and able to convince critics that his views are the right ones without being dogmatic or offensive. His duties are multifarious and ever varying, and he must be capable of advising on almost every subject, and of carrying out an almost endless variety of work. He is bound to make some enemies, if he faithfully discharges his duties, and unfortunately some of these enemies may be members of the local authority he is serving, but if he acts without fear or favour he will find many friends who will support him when trouble arises.
unless he has unfortunately lost his temper, even under the most trying circumstances, or said something hasty and without due consideration. His actual executive work may sometimes be very difficult and trying, a troublesome or inefficient contractor may cause him some sleepless nights, a "row" with a committee is always an unpleasant incident, but if he feels he has done his best under the circumstances, and has not made a fool of himself, these unpleasant episodes soon pass and are forgotten, and the interest one takes in one's work and the pleasure of seeing a town develop, are sufficient reward.

I made a great many personal friends at Portsmouth—one of my greatest was the late Major-General Drayson, R.A., who was one of the most able and talented men I have ever met, and with whom I spent many enjoyable holidays in the New Forest, with every acre of which he was familiar. During our rambles he gave me many a lesson in how to think and how to observe. He had been at one time instructor of surveying and practical astronomy at the Royal Academy, Woolwich, and his knowledge on these subjects was profound. He held peculiar views on astronomy, contending that for many years past we had possessed no real astronomer, but that they were merely "star-gazers," and observers, and that if they had turned their attention to this planet on which they lived they would have found that the time spent on observing the proper motion of the fixed stars was sheer waste of time, and that this apparent motion was due to what he called "the second rotation" of the earth. He claimed to have discovered, that in addition to the daily rotation and annual revolution round the sun, the earth has a slow second rotation round an axis inclined about 29° 50m. to the axis of daily rotation. So far as I can remember he said that this second rotation took about 36,000 years, to complete, and that it fully explains the precession of the equinoxes, etc., and also accounts for the decrease in the obliquity, and shows that about 13,000 years B.C. the pole of the heavens was about 36° 20m. from the pole of the ecliptic. General Drayson took the view that the arctic circle then extended to all latitudes down to 54° 35m., that this must have lasted for about 17,000 years, which fully accounts for the geological discoveries of glacial epochs, and that these epochs must have been recurrent during countless aeons of time. General Drayson has written several books on this subject, but his "theories," as they are called, have not so far as I know been accepted. He had been a great sportsman in his early days, having spent months in South Africa, in the forties, alone with the Zulus and was an adept at their language. He
always contended that they were the bravest, most truthful, and honest race on the earth, and he has written several boys’ books of adventure dealing with his life there, such as *Sporting Scenes among the Kaffirs, Tales of the Outspan, Among the Zulus*, and others, all published in the fifties. He had an astonishing knowledge of, and skill in all games, was a brilliant chess player, a well-known whist expert, and the writer of a standard book on the latter subject. He was also a first-class billiard player. I saw him play Cook once, a thousand up; Cook gave General Drayson 500, and only just managed to beat him. I was fortunate in having him as a friend the whole time I was at Portsmouth, for he did not die till the year 1901, at the age of 75. He was an ardent spiritualist, and I have sat with him at séances, but without, to me, any definite results. He was, however, so shrewd and clever a man, and I have known so many able and wide thinkers who have been impressed by spiritualism that I feel sure there is more than half a truth in it. Like everything else in this life, unless one has studied any phenomena from A to Z, it is presumption to pass an unfavourable opinion, or a doubt, as to the truth or otherwise of such phenomena.

Another of my personal friends was Dr. Arthur Conan Doyle, now Sir Arthur Conan Doyle, the world-renowned author, and creator of Sherlock Holmes. General Drayson and I and Hugh S. Maclachlan (the then sub-editor of the *Hampshire Telegraph*), used often to go to Doyle’s house after dinner, and, in his smoking-room, discuss all sorts of subjects, from metaphysics to more mundane matters. How well can I remember those enjoyable evenings when we settled mighty problems to our own satisfaction.

I find amongst the few letters that I have preserved, one from Mr. Maclachlan, dated December 31, 1891, after I had left Portsmouth, in which he says, *inter alia*:

“ How delighted I, too, should be if there could be a repetition of those cosy, chatty smokes at which we penetrated the veil of the future, each in his own particular way. I recall Doyle’s bold defiance of conventionalities, Drayson’s sarcastms, and your own light keen touch on questions of morality and science. May we meet again some day with spirits just as young, and views as fresh.”

Maclachlan, soon after this date, became sub-editor of the London evening paper, *The Star*, and I saw him occasionally, but, alas, he died many years ago. I must not forget a young Turkish naval officer, named Mehemmed, and a young Japanese naval officer, S. Noguchi, both attached to the English Navy to learn their duties and both on board H.M.S. *Duke of Wellington*, then at Portsmouth. They had introductions to us, and used frequently
to dine with us and come with us to dances, etc. Noguchi, although he had been a much shorter time in England than Mehemed, could talk English much the better, and was a much cleverer and brighter young man than the Turk, and it struck me a good deal that the "Jap" had far more native intelligence than the Turk. I wonder if either of these young officers is alive. They rejoined their respective navies whilst I was at Portsmouth and I heard no more of them. Perhaps they were both killed, one in the Russian-Japanese war, and the other in the recent great war. Who knows? This acquaintance of ours took place in 1885, nearly thirty-five years ago.

But the most important acquaintance we formed, which grew afterwards into friendship, was with Mr. and Mrs. A. P. Sinnett, who used to come frequently from London for visits to Southsea. Mr. Sinnett was one of the early pioneers of the movement which brought the teachings, and study, of theosophy from India to England. My wife and I were very soon struck with the reasonings, and philosophical teachings, of theosophy, which seemed to account for nearly all the difficulties, and perplexities, surrounding religious dogmas, and to fill the numerous gaps and discrepancies, which had so often puzzled us. I had been through the very forbidding, and depressing, evangelical teaching in my childhood, with the almost inevitable result of disbelief as my mental capacity developed. Then naturally followed a reaction and for a time much depression on these matters, and the difficulty of carrying out Bible teaching with modern practical life. Then I had the good fortune to meet Mr. Sinnett and my doubts and difficulties gradually disappeared. People have sometimes asked me, "What is Theosophy?" They might just as well ask, "What is Mathematics?" for it would take many books to explain the tenets and revelations of this knowledge. The mystic or occult side of theosophy has never appealed to me. This requires a very special turn of mind, and a partial withdrawal from the more mundane activities of the material life, but the unanswerable philosophy, and the extraordinary "common sense" views of the reason for human life, and human suffering, seemed to explain all my perplexities, and filled me with hope. Broadly speaking, theosophy is merely an extension of evolution, embracing not only this planet, but the whole solar system and extending from the infinite past to the infinite future. It accounts for all religions and dogmas, it expands and magnifies one's conceptions of the Divine power, it substitutes law for blind faith, it explains the apparent unfairness of some people being born to misery, whilst others have
a "good time," all through their lives. It shows us that as we shall sow, so we shall reap, not from what we call moral merit, but as an immutable law, as fixed as the law of gravity, which would smash my material body if I fell off a roof. The crux of the whole question is of course whether, at death, our real self, or "ego," dies with the body or lives for ever. Theosophy claims that the "ego" must already be in eternity, that it has existed in eternity in the past, just as much as it will live in eternity for the future, that this ego naturally varies in every man, woman, and child, that it is unreasonable to suppose that at death, all egos should pass over into a place of bliss or into a place of misery, but that the soul is going through a process of evolution just as much as man has been known to progress and evolve on this planet. That as eternity is an unthinkably long period of time, it has got to be filled up in some way, and consequently the ego exists, and is reincarnated in the bodies of mankind over and over again, so that the experience it gains by each incarnation may enable it to progress to such an extent that it is no longer necessary for it to be reincarnated on this planet.

To what this inevitably leads is beyond my comprehension, the infinite is unthinkable, as is also the thought of space. I must leave it at that, merely saying that science shows us that "matter" is indestructible, and that "force" is also indestructible, so by analogy I think it is sound reasoning to assume that the human "ego," the real man, not the mere envelope which surrounds it, is equally imperishable and the moral and mental energy of an individual cannot be destroyed by the death of his body, but that it lives for ever, and that if he has developed in his short life on this planet, he will return in due time and be "born again" in those conditions and surroundings which will evolve him still further if he takes advantage of his opportunities for advancement.  

Soon after taking up my appointment, I joined the Portsmouth Literary and Scientific Society, of which Dr. Ward Cousins and Dr. A. Conan Doyle were then the joint Secretaries. I read several papers at this Society and eventually was elected President, which I looked upon as a great honour. Amongst some of the papers I read before this learned body was "Portsmouth from a Sanitary

1 It was of deep interest to me to find after I had written the above, that my friends, Sir Oliver Lodge and Sir Arthur Conan Doyle, had convinced themselves of this continuity of life after death. When such men as these and others have satisfactorily proved a fact of this tremendous importance, does it not seem strange that individuals who have taken no steps to investigate the problem, should attempt to criticise and condemn these courageous investigators.
Point," "Engineering Triumphs," and others which I have forgotten. I also joined a Naturalists' Society and had many interesting jaunts with them in the New Forest. I gave them two lectures on Nature's forces, with numerous experiments, which I thoroughly enjoyed and hope my audience did also!

In the year 1889 I was elected President of the Association of Municipal and County Engineers, and the annual meeting thus had to be held at Portsmouth. It is always a two or three days gathering and in addition to papers (including the presidential address) which are read, it is usual to inspect works of interest in the locality and to arrange for various hospitalities. I set to work to arrange an attractive programme and think I succeeded. Of course, the Portsmouth Dockyard, and all the unique show that such a place offered, was my first thought. I approached the dockyard authorities but was received with some coldness. Fortunately, one of my brothers was then Member of Parliament for East Marylebone and knew Lord George Hamilton, who was at that time First Lord of the Admiralty. I wrote to my brother fully explaining the position and he approached Lord George, with the result that a most excellent programme was arranged whereby the association was shown everything that the dockyard could possibly show us, including a display of torpedo boats jumping booms in the harbour, the mysterious Brennen torpedo, and even a parade of bluejackets and a display of machine guns firing on Whale Island, in addition to free trips on torpedo boats running at full speed.

Towards the end of this year 1889 I heard that there was a vacancy for the appointment of City Engineer of Liverpool, and in due course I made application for the appointment, and was duly elected. I may perhaps with pardonable pride, be allowed to give the following extracts from an article in a leading Portsmouth paper which appeared on the occasion of my resignation:

We view Mr. H. Percy Boulnois' new appointment with divided feelings. Mr. Boulnois has for seven years filled the office of borough engineer in Portsmouth, to the marked and increasing satisfaction of the corporation and all his colleagues in municipal work. It is no light matter to be deprived of the services of so energetic and competent an official, and for that reason we share in the general regret that Mr. Boulnois is going to leave us. At the same time, it is the cause of sincere pleasure and pride to us that the second city of the United Kingdom should have to come to Portsmouth for her city engineer. That is the important and influential post for which Mr. Boulnois has now been chosen by the Selection Committee of the Liverpool Council, and we congratulate him most heartily on a promotion which is more than justified by his high professional attainments, his ripe and varied
experience, and his charming personal qualities. Mr. Boulnois' name will be associated in Portsmouth with many important public improvements. Flathouse Jetty was completed under his direction, at a cost of £27,000. He carried out the drainage of Stamshaw on the separate system, also the surface improvements which made that district what it is, and at present the Stamshaw recreation ground is being laid out under his supervision. The reconstruction of sewers in the borough and their ventilation by means of shafts was skilfully effected according to his plans. He has dealt with many miles of private streets under the Public Health Act, putting streets in thorough repair and recovering the cost from the owners, and it is generally admitted that this work has never been so closely kept up as during Mr. Boulnois' rule. Further street improvements suggest themselves to us—the widening of Fratton Street and of Commercial Road, the Greetham Street works, and many others. It is largely due to his skill that the Camber Quay property has been so much improved. The new Custom House and the Wharfinger's Offices are both his work, and he has prepared a scheme for the improvement of the ports of Portsmouth and Portsea, on a large and comprehensive scale. This scheme, which would involve an outlay of £150,000, is at present being considered, along with market schemes and many other plans for the improvement of the borough which will have to be taken up by Mr. Boulnois' successor. We have further to thank Mr. Boulnois for the improvements on the Common and the sea front, which have wrought so marvellous a change in Southsea as a watering-place, while he transformed the once wilderness near the Beach Mansions into the smiling canoe lake. Then there is the concrete path and wall near Lumps Fort, which prevents the sea dashing over and damaging the road as formerly, while those who remember the road in front of the Parade houses seven years ago, with its width of eighteen feet, and the melancholy brick wall running all along against the Common, must feel grateful to him for having made it what it now is, one of the finest drives in England. It is impossible to mention here the many public works on which he has been engaged. We recall the additional wards at the infectious diseases hospital, the Copnor sewage scheme, the Pembroke Gardens, which made such timely provision for a large body of the unemployed, and the razing of the Saluting Battery and construction of the path from Portsmouth to Southsea Common, which, when completed, will make so great an addition to that part of the borough. In all these and other improvements the Corporation have been aided and strengthened by Mr. Boulnois' scientific knowledge and untiring zeal. He will now have to deal with larger schemes, involving greater sums of money. He goes with the honour that follows duties well performed, and with the earnest hopes of troops of friends in Portsmouth that he may succeed.

On my relinquishing my appointment at Portsmouth, my staff gave me a set of handsomely bound volumes of Spon's Engi-
neering Dictionary, with the following inscription: "In gratitude
for seven years of kindness and consideration to his staff—Fortuna
Sequator."—and it has!

My workmen also gave me a beautiful cigarette case and holder.
Some of my friends also gave me a gold watch and chain, "in token
of the esteem and affection of his friends in Portsmouth," and my
wife an extremely handsome French clock on a marble stand, the
"portrait" of which appeared afterwards in the Daily Graphic!
I have every reason to believe that my friend Arthur Conan Doyle
was the prime instigator of this movement. The Town Council
gave me a farewell dinner, at which many regrets were expressed
on my leaving Portsmouth. All these expressions of good feeling
were very gratifying to me, as a municipal officer often wonders
whether his work is being appreciated, or whether the Council and
the citizens are dissatisfied with his work and actions. In this
connection I was more than agreeably surprised to receive the fol-
lowing letter from the Ratepayers' Association, as such associations
are so often formed to criticise, and perhaps obstruct, the activities
of the Town Council and their officials:

County of Portsmouth,
Ratepayers' Association.
February 7, 1890.

Dear Sir,

In accordance with a Resolution passed at the usual Monthly
Meeting of the above Association on the 6th inst., it gives us sincere
pleasure to convey to you the Association's high appreciation of the
manner in which you have for the past seven years filled the position
of Borough Engineer and Surveyor; our regret at your leaving us, our
congratulations on your appointment as City Engineer of Liverpool,
and our hearty, and unanimous, wishes for your future prosperity and
advancement in the profession to which you have the honour to belong.

We are, dear Sir,

Very faithfully yours,
(Signed) G. J. MERRITT, President.
JAMES WILLIAMS, Secretary.

I believe that such a testimonial, from such a source, is almost
unique amongst the experiences or reminiscences of a municipal
engineer and I treasured this letter accordingly.

Just as I was retiring, I was made a Freeman of the City of
London. The following is a copy of this important document.

"Freedom to wit." Henry Percy Boulnois, Citizen and Plumber,
of London, was admitted into the Freedom aforesaid and made the
Declaration required by Law in the Mayoralty of James Whitehead, Esq.,
Mayor, and Benjamin Salt, Esq., Chamberlain, and is entered in the book signed with the Letter 'F. I.' relating to the purchasing of Freedoms and the admissions of Freemen (to wit) the 26th day of October in the 53rd year of the reign of Queen Victoria, and in the year of our Lord, 1889.

"WITNESS whereof the seal of the Office of Chamberlain of the said City is hereunto affixed dated in the Chamber of the Guildhall of the same City, the day and year aforesaid."

Armed with this quaint document, and leaving many friends behind me, I proceeded to take up my appointment at Liverpool.
CHAPTER VII

LIVERPOOL

I entered upon my duties as City Engineer of Liverpool on February, 1890.

I found a very different state of affairs to that which I had left at Portsmouth. Whereas at the latter place I had a staff of only five or six assistants, I found at Liverpool that my salaried staff consisted of nearly seventy individuals. I found an invaluable secretary with an assistant secretary, a chief clerk with twenty-one assistants, a superintendent of the drawing office with eleven draughtsmen, augmented temporarily as occasion demanded, a chief mechanical assistant, a man of exceptional ability, Mr. John A. Brodie, who afterwards succeeded me as City Engineer, a chief surveyor of roads, with an assistant surveyor, four district surveyors and four street foremen. A foreman of gas and water trenches, a receiver of materials, and several timekeepers. A chief superintendent of the sewerage department with two assistants, and four sewer inspectors, and a flushing inspector. A chief assistant building surveyor, with an assistant and four district building surveyors. A chief storekeeper, a superintendent of disinfecting establishments, and a staff of men connected with the maintenance of the tramways, which belonged to, and were maintained by the Corporation but were worked by a private company.

I found I was the Gas Inspector under the Acts, and there was an assistant gas inspector with five assistants, a gas meter tester and an assistant. I was also electric inspector, and had an assistant with the necessary staff. It will thus be seen that my first few months at Liverpool were excessively busy and the days were scarcely long enough for me to transact all the work I had to do; but the following cutting from a local newspaper The Porcupine (I wonder if it still exists), somewhat reassured me as it was as follows:—

"Mr. H. P. Boulnois has entered upon his new duties in Bedpost Place with vigour. Already he has made himself master of the com-

1 I never discovered, nor do I know to this day, why the writer of this paragraph called the municipal offices "Bedpost Place." Mr. J Berkeley Smith was chairman of the Health Committee and died whilst I was still City Engineer.
plicated administration of the Health Committee, and Mr. J. Berkeley Smith, who is not a man to be easily surprised, seems astonished at the remarkably quick manner in which Mr. Dunscombe's successor has grasped the sanitary situation."

"Mr. Boulnois has very favourably impressed all the City Fathers with whom he has come in contact and they predict that he will prove one of the ablest officials who has ever filled the post of City Engineer."

I had nothing to do with the collection of house refuse or the cleansing of the streets, nor with the public parks, public buildings, markets, cemeteries or the like, so that although my work was considerable, it was not so varied as it had been at Exeter or at Portsmouth.

It is also more difficult to describe in much detail the works on which I was engaged as I had not the personal touch with them that I had had at Portsmouth or Exeter. Although I was of course solely responsible to my committee and the Council for all the work of my department, I had perforce to leave a great deal of the detail to my staff and was frequently not called in for personal supervision unless some difficulty was encountered which had to be overcome.

Just one hundred years before my appointment, viz.: in 1790, a Mr. H. Moss had written a Guide to Liverpool, in which he stated: "Liverpool being the first town in the Kingdom in point of size and commercial importance, the metropolis excepted, has of late been the resort of a great number of visitors for the purposes of commerce." What would Mr. Moss have said if he could have seen Liverpool as I knew it, where the "visitors" had increased and prospered, and where anyone with less than £3,000 a year was looked upon almost as a pauper!

I think one of the early reports I had to make was in connection with the provision of a refuse destructor. Up to then the Corporation had been able to dispose of this refuse by barging or railing it away to tips or as manure for land, in addition to which they had two special steamships the Alpha and the Beta, carrying, when fully loaded, 330 and 400 cubic yards respectively. Each vessel had a large central well or hopper divided into ten compartments with vertical or slightly undercut sides, each compartment fitted with a pair of doors hinged to the keel and bilges which were raised and lowered by chains through gearing worked by a small engine specially provided for this purpose. The original loading of these barges was done by hand and it took thirty-five men working all night to fill one of these steam hopper barges. Consequently special iron canal barges were built, each carrying about 50 tons of material, fitted with light steel and steel-frame wooden boxes, each holding
about two tons. These boxes were filled direct from the scavenging carts from a projecting cantilever platform at certain depôts on the Leeds and Liverpool Canal. The barges were then taken down the canal to alongside one of the above-mentioned ships, the derrick on the ship was 60 feet long by 16 feet wide. A 66 feet derrick with steel rope which was fitted on the ship, shipped each box on board, tipped and emptied it and returned each box to its place on the barge. This arrangement was worked by one winchman and four labourers, and it took about 15 minutes to get 50 tons of refuse on board. When the Alpha and Beta were loaded they at once proceeded to the deposit ground outside the North-West Lightship, a distance of about 24 miles from the landing-stage, and the refuse was discharged into deep water by lowering the hopper doors, which were afterwards closed and the vessels returned to their berths. The total trip occupied about seven hours, dependent upon "wind and weather." Up to the end of December, 1891, about 145,000 tons of refuse had been disposed of in this manner, and the total cost including loading averaged rs. 6½d. per ton.

Such a method is no doubt well adapted for seaport towns as the cost is reasonable, but certain difficulties were experienced—for instance the lighter portions of the refuse float and were said to spoil certain beaches of seaside resorts. It was also stated that tins, etc., found their way on to the fish-trawling grounds, and of course occasionally the weather was too rough for the vessels to proceed to sea.

In view of the increasing difficulties in obtaining tips for the refuse, the Health Committee instructed me to make a report upon the cost of the construction of a destructor containing twelve cells and the saving over the present systems which would be effected by the use of a destructor. This I did, and eventually I designed and erected a 12-cell destructor on the Manlove and Alliott principle at Chisenhale Street Wharf at a cost of about £7,500, which worked most successfully, with the result that several more destructors were afterwards erected in various parts of the city.

There was one rather amusing incident in connection with this destructor, the chimney shaft of which was about 170 feet in height. Soon after it had commenced working a bulky letter was delivered to me by hand, and on opening it I found a large number of pieces of partially charred and burnt paper, and a letter from a well-known firm of sugar refiners to say that these "foreign objects" were daily coming in to the top drying floors of their refining house, and were not assisting in sugar bleaching. An immediate inspection showed me there was no doubt that these objectionable bodies did issue
from the top of the chimney, but with a slight alteration in the flues, and the insertion of some screens, the whole trouble was got over, and I never received another complaint of any nuisance arising from this destructor.

The following particulars with regard to Liverpool may be of interest, and I venture to give them, though no description of mine could convey the extraordinary development of this mighty city.

The first dock was constructed in 1715 at the mouth of a pool which was said to have been frequented by a peculiar description of waterfowl called the "Lever" or "Lyver,"—hence the name Liverpool. This dock was always known as the "Old Dock," but was filled up in 1826, and a post office and custom house built on the site. In 1864 the area of the docks and basins exceeded 255 acres; and in 1891, the year after my appointment, the area was 381 acres. The population in 1891 was 517,116, equal to a density of 99 persons per acre. There was practically no building land available in Liverpool at the time of my appointment; it was all built over. Several attempts had been made for extensions, one in 1890, just after my appointment, which was rather "hard" on me, but the Parliamentary Committee before whom we appeared refused to grant the extension.

The early reports on the sanitary condition of Liverpool dating from 1840, revealed a terrible state of things, and in 1842 the Corporation obtained an Act entitled "An Act to provide for the Health of the Inhabitants of the Borough of Liverpool and for the better Regulation of Buildings within the said Borough." This Act empowered the Council to appoint a "Health Committee," which was the committee to which I was directly responsible. This Act is interesting as being the first Act ever obtained which contained powers to enforce sanitary regulations. In the year 1846 the Corporation obtained another Act, "The Liverpool Sanitary Act, 1846." This Act, _inter alia_, empowered the Council to appoint, "subject to approval by one of Her Majesty's Principal Secretaries of State, a person duly qualified as a civil engineer to act as local surveyor," and by the Liverpool Sanitary Amendment Act, 1854, it also enacted that he shall be called, and known, as "The Borough Engineer."

When the borough became a city, this title became that of City Engineer, and Liverpool consequently is the only town where such an appointment requires the approval of a Secretary of State, and where the title Borough Engineer is conferred upon him by Parliament. In my case my appointment was confirmed by the President of the Local Government Board without any difficulty.
as I am glad to be able to state that I was unanimously elected by the Council.

It is interesting to note in connection with these remarks about Liverpool that in the year 1847, during one of the Irish famines, there was a tremendous influx of Irish people, and this influx left a terrible legacy to the city in the shape of the awful rookeries or slums which were built in various parts of the City to accommodate this poverty stricken and irresponsible population.

I shall refer to this subject when dealing with the steps which the Corporation had to take later for the demolition of these horribly insanitary areas, and the provision made to rehouse the large number of persons displaced by these very necessary improvements. The result of these clearances and other sanitary measures reduced the death-rate from 63.5 in 1847 to 26.1 in the year 1891. Another great sanitary work undertaken by the Corporation was the conversion of privies and cesspools into water closets, no fewer than 18,000 having been so converted between 1876 and 1885, with the result that in 1891 no privies or cesspools remained in the city.

At the time of my appointment there were 258 miles of brick and pipe tributary sewers, 267 miles of what were called "passage sewers," and 30 miles of main outfall sewers ranging from 5 feet by 3 feet egg shape to as much as 9 feet in diameter. In addition to this there were still existing about two miles of sewers constructed in the sandstone rock without any lining, but these were being rapidly lined with brickwork, and I think that before I left all this work had been completed. The whole of the sewage of Liverpool, as it then existed (this was before the extensions which afterwards took place), discharged into the River Mersey through 10 outfall sewers of large diameter, some of them passing under the docks in cast-iron pipe syphons, and though some of these must have existed for 40 years or more, they showed no signs of decay; on the contrary the sewage appeared to have formed a sort of skin on the submerged inverts which protected their surface. Some of the tributary sewers had not been constructed with self-cleaning gradients and consequently they had to be regularly flushed, this being effected by means of large tanks on wheels which were drawn over the manholes, then filled with water from the nearest hydrant, and by means of a large telescopic funnel, or pipe, which was lowered down the manhole, about 2,000 gallons of water was discharged in 28 seconds. All court and passage sewers were flushed regularly four times a year, and the whole of the private house drains twice a year. The drains of hospitals and public institutions were flushed at intervals ranging from a fortnight to-
three months. All this flushing cost a good deal of money a year as many gangs of flushers were employed and the water used had to be paid for to the Corporation water department.

There were 258 miles of adopted streets when I went to Liverpool, and in 1893 I find that 1,651,000 square yards of these streets were paved with granite or syenite setts laid on concrete, 27,000 square yards of natural compressed asphalte, and only 18,000 square yards were paved with wood blocks. The chief reason for this small amount of wood being used as a pavement was that from the year 1885 it had been the custom of the Health Committee to agree to pave streets with wood provided the owners of abutting premises paid 60 per cent. of the first cost. This decree naturally restricted the use of wood blocks as a pavement. Whether this edict is still in force I do not know.

But of course the traffic in some of the streets of Liverpool is the heaviest in the world, and consequently most of the streets had to be paved with the best granite or syenite setts laid upon a special concrete foundation. A description of this foundation, which is, I believe, unique, is as follows:—

The ground having been excavated, thoroughly consolidated and properly graded to the requisite depth and shape, a layer of broken stone was opened evenly over the surface and thoroughly wetted. A stratum of fine concrete was then laid on this, about two inches in depth, composed of one part by measure of portland cement, and five parts fine gravel, thoroughly mixed and incorporated together in a dry condition, then slightly wetted and turned over three times. Upon this stratum a second layer of dry stones was added and beaten down into place. These layers were repeated until the requisite thickness, varying between six inches and nine inches, was reached. In this way a flat arched wall of random stone or beton was formed which was able to resist the shocks and compression to which it was subjected. The foundation thus prepared was allowed to harden for several days, when the setts were paved on it, racked with fine gravel and grouted with hot pitch and creosote oil.

In my day at Liverpool there were no self-propelled vehicles, but even then the procession of heavily laden horse-drawn lorries along some of the streets was a severe trial to their surfaces, and in some cases amounted to about 380,000 tons per yard width of carriageway per annum. Sometimes such a heavy load per axle was carried that the best syenite setts 6½ inches in depth were actually split.

One of the most unpleasant duties I had to perform at Liverpool
was in connection with the insanitary areas which had to be "presented" for demolition. I have already explained how these rookeries had sprung up in various parts of the city, and the powers which the Corporation possessed for their demolition. In connection with this work I had to inspect these areas for the purposes of my evidence before the grand jury, in order to condemn them, and subsequently before the arbitrator in order to fix the value of the houses, and the inspection of these houses was an exceedingly unpleasant task, owing to their want of ventilation, and the class of persons who occupied them. The following description of a typical court in which these houses were situated can only give a very faint idea of their terrible condition and surroundings.

The total area of only 200 square yards (on which no fewer than ten three-storied, houses existed) had a frontage of 30 feet towards a narrow street, and a depth of 60 feet. Under one of the houses, fronting on the street, there was a passage, or tunnel, 2 feet 10 inches in width, through which access was gained to the court, only eight feet in width, with four houses on each side, of three stories in height. At the end of this court was a high wall of an adjoining factory, so that the court was a mere narrow well-hole. None of the houses had through ventilation, as they were all back-to-back houses, and the only air they received was obtained from this narrow eight feet well-hole. From sixty to seventy persons would be found living in this court, which is equivalent to 1,680 persons per acre! Each of these court houses had a frontage of 11 feet, and were only 11 feet in depth, including their walls, with staircases inside the living rooms!

It seems almost incredible that people could live in such "dwellings," and the stench of "esprit de corps" and "bouquet d’homme," in them was almost unbearable. Even the court, or well-hole, was stuffy to a degree, but the houses themselves were unspeakable. It was impossible to inspect more than one of these courts at a time without going out afterwards to some open spot in the neighbourhood and filling one’s lungs with fresh air. As a gruesome incident which occurred to me in one of my inspections, I recall that on a woman opening the door to me, I was greeted with the most appalling smell. "Do you keep a fox here?" I said, when she replied, "No, plaize your honour, it’s the baby."

Does it not seem strange that there could exist owners of such property, but I am glad to say that when these properties were condemned the owners got little sympathy from the arbitrator as to their value, which was generally held to be that of the "bricks
and mortar” alone and no rental valuation. I got into sad hot water once at Liverpool by stating in one of my addresses as president of the North-Western Sanitary Inspectors’ Association, that owners of such houses should be prosecuted in the same manner as people who sold adulterated food. But I thought so then and am still of the same opinion. Fortunately there is nearly always a humorous side to most things in this life, and apropos of this demolition of such “property,” I can recall one of the best “bulls” I ever heard. Owing to this demolition a great many voters were displaced, which caused some degree of “party” opposition, and on one occasion at a meeting of the Council when one of these terrible areas was under discussion, an Irish member, when speaking against the proposed demolition, made the following peroration:—

“Me Lord Mayor, every house ye pull down in this magnificent city, leaves a hole in it, which is a standing monument of disgrace to it.”

Up to the time of my appointment no fewer than 3,500 insanitary houses had been dealt with, and the majority of the inhabitants housed in working-class blocks of tenements which the Corporation erected from time to time, and this splendid work has been carried on ever since, and is still continuing. But what a scandal it seems that such a legacy of cleansing the Augean stable should have been left, by our unscrupulous ancestors, to the present generation.

The City Surveyor’s department had designed and erected all the new blocks of artisans’ dwellings up to the year 1895, but in that year the Insanitary Property Committee asked me to submit plans, and suggestions, for the erection of suitable houses for the lower labouring classes. In my report I said it was essential to assume a rental per room which such a class could pay out of their earnings, and I fixed this unit at one shilling per room per week. I also said that the dwellings should be constructed so as not to attract the ordinary artisan, but the class now occupying the rookeries, who should be provided with low-rented, sanitary, self-contained tenements and not with dwellings contained in large blocks of buildings. Further, that one to three rooms, in most cases two rooms, in each tenement was sufficient, as it was found that even in the court-houses where three rooms were provided, only two were usually occupied, the third being used for lumber, if at all. I submitted eight types of such buildings and I showed by estimates that allowing 12s. 6d. per square yard as the value of the land, which was the price at which the Corporation sold such land, and with rooms rented at one shilling each per week, there would be a return on the money expended at from £3 18s. 3d. up
to £5 6s. 5d. per cent. per annum, according to the type of houses selected. After a long period of delay I was instructed to erect a block of one of the types, and although I gave each tenement a separate water closet, and the plumbing work was of the best, the Corporation were able to let at a rent which worked out at from 1s. 1d. to is. 3d. per room per week and secured £4 10s. per cent. per annum on the outlay, including the land. Thus I very nearly achieved my unit of a shilling a room per week, and only failed through my anxiety to secure the most perfect sanitation.

These houses were erected in a row with a four-roomed tenement on the ground floor, two two-roomed tenements on the first floor and two one-roomed tenements on the second floor. They were built of plain brickwork with the window sills, door heads and dressings of concrete made with the clinker from one of the refuse destructors, and the stairs and floors were constructed of a similar concrete, thus making use of a waste product, from a waste product. The floors had to be close-boarded, or decked, on the concrete, as the class of tenant occupying such houses is not careful as to its habits, but there was no other woodwork except the doors, which were “ledge” doors of strong make. This again was necessary, owing to the proclivity of such tenants to make use of any woodwork for firing when other fuel is scarce. The window sashes were of iron with small panes of glass which could be easily and cheaply replaced when accidentally or wilfully broken.

I put no plaster on the inside walls, which were merely colour-washed, and they were certainly not the description of dwellings likely to attract the better class labourer or artisan, but they became occupied at once by the very class that I was desirous to “house,” and this was, I contend, a successful experiment to try and solve the troublesome housing question. Incidentally I may remark that when visiting these houses later, after they had been occupied for some time, I found that the bare walls had in many cases been decorated with cheap and gaudy-coloured prints of religious subjects which had been given the tenants by the priests. I still hold to the opinion that the better class artisan should be provided with houses by private enterprise and that it is the duty of the local authority to provide houses for the “submerged tenth.” I look with grave fears as to the economic results which will follow the present movement for the provision of houses by the State, or by the local authority, at a cost which will not be met by the rents which are to be exacted.

It seems to be a false policy to provide Smith and Jones with houses, and that Brown and Robinson, less fortunate ratepayers,
should be taxed to pay a large proportion of the rents to make up the deficit. To whom is it to be left to select these fortunate individuals who are to live in these premiated houses at the expense of other members of the community?

Under the Act to confirm a Provisional Order of the Local Government Board, which received the Royal Assent on September 5, 1895, the boundaries of the city were extended, and on November 9 of that year the following places were added:—the whole of the Districts of Toxteth Park, Wavertree, Walton-on-the-Hill, and a part of West Derby. By this extension, 8,026 acres were added, making the total area of the city (exclusive of water), 13,236 acres; 138 miles of roads were added, and 106 miles of sewers, and 19 miles of tramways. The sewage farms of West Derby and Walton-on-the-Hill came into our possession, with an acreage of about 385 acres.

Not only did the preparation of the information for the Local Government Board Inquiry, preceding the Order, give me a large amount of additional work, but also the arrangements for the working of the added areas, with their existing engineering and other staffs for whom places had to be found in my department. In connection with this rearrangement of staff it is interesting to note that in the report I made to the Health Committee on the subject, I incidentally gave the following statistics showing the large amount of clerical and book-keeping work that had been done by my department for eleven months up to August 31, 1895.

1,326 resolutions of committees were dealt with, 978 written reports were made to committees, 7,487 letters were received and 7,703 letters written, 1,624 sundry notices were issued, and 2,780 official orders were issued for materials, 1,713 bills were issued for work executed by my department, and 3,571 bills were received, checked, and passed for payment. These figures give some faint idea of the ordinary routine work of an engineer to a large city, in addition to the vast amount of constructional and other engineering work which falls to his daily lot.

Another special work inherent to a City Engineer's duties is that of watching, and if need be, opposing Bills in Parliament, as well as their promotion, and a good deal of my time was also engaged in this work. The Liverpool Corporation had permanent London offices, which were then situated at Storey's Gate, where there were then blocks of offices, long since pulled down to make way for the existing building belonging to the Institution of Mechanical Engineers. I had constantly to be at these offices on various work, and, needless to say, my travelling had mostly to be done at night.
I could extend my engineering reminiscences at length, but it might become wearisome if I did so, and I will, therefore, pass on to other more social recollections.

Soon after my appointment the United Club was started, consisting of engineers, architects, solicitors, and other kindred professions. I was elected president and so remained until I left Liverpool. We were a very cheerful and "united" body, and I made many close and dear friends amongst them. I also belonged to a very peculiar little club which called itself the Hockenhall Alley Club. There were no written rules and the election of members was only by mutual consent. We had no club-house, but we met after lunch in a room at Eberley's Restaurant for coffee and a smoke. The president was E. de Kuyper, a Dutchman with most charming and good-natured personality, who was a professed cynic and follower of Voltaire. The vice-president was a Mr. A. P. Mignot, a naturalised Englishman, of French birth, born in America! He had the longest beard I have ever seen, and in windy weather he tucked this inside his waistcoat, whence it projected beneath like a sporran. The other members were Harcourt E. Clare, the Town Clerk of Liverpool (now Sir Harcourt E. Clare, clerk of the County Council of Lancashire); E. W. Pierce, the Deputy Town Clerk; Dr. E. W. Hope, the Medical Officer of Health of Liverpool; T. Shelmerdine, the City Surveyor; W. W. Marks, now clerk to the County Council of Bedfordshire; E. Kirby, a well known architect, and C. Lancaster, H. E. Braddyll, W. Hope, R. Rensberg and Allan Sandys, whilst the late George Norton, a well-known solicitor, acted as secretary.

We used to have the most lively and interesting discussions over our coffee, and prided ourselves on settling the most important national questions that were before the public at the time.

I was also a member of the Liverpool Engineering Society, and was elected president in due course. We used to have very interesting papers read at our meetings, and the discussions were always of a very high order. Dr. Tudsbery, who is now the secretary of the Institution of Civil Engineers, was at one time our secretary.

I was also elected president of the North-Western Sanitary Inspectors' Association, on the death of Dr. Alfred Carpenter, and remained their president till I left Liverpool. It used to be somewhat difficult to prepare my presidential address every year and to find fresh subjects to talk about.

In the year 1892 I was made president of the Conference of Municipal and County Engineers, which was held at Portsmouth in connection with the annual congress of the Royal Sanitary
Institute. This was the first conference of the kind and I felt very gratified at being elected. I took as my subject for my address, the work of a municipal engineer, and I had a large diagram or chart prepared showing the various subjects and their ramifications with which a surveyor had to deal, comprising engineering, architecture, law, administration and miscellaneous, and these were subdivided under ninety-eight different heads. I pointed out the rapid evolution of the municipal surveyor from the "fustian jacketed plodding man of highways and byways" as described by Sir Henry Acland, not many years before, into the skilled and scientific municipal engineer of 1892, some of whom held a world-wide, as well as a local, reputation. My diagram was so much appreciated that it was afterwards published by a firm of publishers and commanded quite a brisk sale.

In 1893 the Royal Sanitary Institute held their Congress in Liverpool, and Dr. Hope, the Medical-officer of Health, and I were joint secretaries. I gave a paper on "Housing," and protested against the attempt then made by legislation to provide sufficient accommodation to replace the population displaced in the same area, and I suggested that instead of building large blocks of artisans' dwellings, houses should be built in the suburbs, and cheap railway and tramway fares should be introduced so as to relieve the congestion. This was prophetic, as the present tendency is to carry out exactly what I foreshadowed twenty-seven years ago!

In 1894 there was a meeting of the Sanitary Association, and in connection with this I received a letter from Sir Robert Rawlinson, K.C.B., who for many years had been the chief engineering inspector of the Local Government Board. This letter is of peculiar interest in connection with the world-renowned St. George's Hall, Liverpool. The letter, which has never been published before, is as follows:

Lancaster Lodge,
No. 11, Boltons,
West Brompton,
London.
September 24, 1894.

My Dear Sir,

You will of course be busy this week with the Sanitary Association. My age and delicate health keep me away. I have had an invitation from the Worshipful the Lord Mayor, but cannot accept it. Have you ever been on the ceiling of St. George's Hall, which is constructed with hollow bricks and is for its dimensions, 65 feet span, the

1 Sir Robert Rawlinson was 84 years of age when he wrote this letter. He was born in 1810 and died in 1898.
largest and lightest brick arch ever turned, ancient or modern. I adopted agricultural 2-inch tiles, making them 4-inches square by 13 inches in length, set in the arch end up, so that when upon the arch you can see the people in the Great Hall 83 feet 2 inches below.

St. George's Hall is certain to be acclaimed by all strangers who care about architecture. The architect was my most intimate friend. There is no foundation stone beneath the building but somewhere near the Nelson Column. You may find it some day. It ought to be removed to the present building.

The present building I assisted Elmes the architect to set out and set the first brick at the corner to the left hand when you stand facing the main front.

The young architect was sent to Kingstown, Jamaica, in a rapid decline, and died after landing in a few weeks. He left the work in my hands, and I retained charge until I had completed the Great Arch, and then as Elmes had wished handed the building over to Mr. Cockerell who completed it. The plans, elevation and details all belong to Elmes, who was only 32 when he died. What a loss to England!

Please to excuse me bothering you about these matters, but you may reasonably understand I am a little proud of the Great Arch (indecipherable) over the Great Hall as the lightest work of the sort ever executed, ancient or modern.

I am,

Yours very truly,

(Signed) Robert Rawlinson.

St. George's Hall was commenced in the year 1838, and the guide books say that Queen Victoria laid the foundation stone in June of that year, so that Sir Robert Rawlinson might have been wrong as to the position of this stone. The letter throws a somewhat new light on this magnificent example of classic architecture, as hitherto nothing has been known of Sir Roberts' association with the building, although I have been told that he started his career as a stonemason in Liverpool, and was engaged as a workman on one of the earlier constructed docks. Truly may it be said that every soldier carries a marshal's baton in his knapsack.

I belonged to a small literary society which met once a month, in the evening after dinner, at one of the member's houses in turn. On one occasion I read a paper on "Peter Ibbetson," by George Du Maurier, the great Punch artist, as in reading the work I had been struck with its beauty and its inner mystic meaning. One of the members, who knew Du Maurier, persuaded me to send my paper to him, and although I did not know him I did so and received the following reply.
LIVERPOOL

New Grove House,
Hampstead Heath.
December 20, 1892.

Dear Sir,

I have great pleasure in answering your letter. First of all about the two points you particularly mention.

(1) It was an afterthought to make my hero a possible lunatic, so that the reader might have the option of believing, of disbelieving, or only partly believing, his story, without ever having to refute mendacity to a man I meant to be rather chivalrous by nature; truthful before anything else.

If you don’t believe what he tells you, let him pass for a madman and have done with him, for he is not a liar.

(2) It is not meant as a skit, although some parts here and there were written with a humorous intention. I neither believe nor quite disbelieve in all I have written about the power of dreaming true, in this life, and our spirits meeting in another. I only wish it to be something like that. I have only tried to fix and express floating daydreams of my own and to write a story of passionate affection that knows no satiety. And also to record sweet memories of my own, which have idealised themselves through time, become crystallised, so to speak.

I read your paper with the deepest interest, and was very much moved to find how well you had seized points that I had intended; and that I had given you the pleasure I had tried to give the unknown reader so difficult to please.

There are two points I would notice:—

I intended no scoff of Shelley’s “Skylark” which is to me as sacred as Bryant’s “Waterfowl.” Also Peter Ibbetson is not my only book, as since then I have written another which has been accepted by the same publishers and will appear (profusely illustrated, I hope) in “Harper’s Magazine” during the year 1894.¹ I have only just begun the drawings, the book was written in the beginning of the year.

It will give me great pleasure to see you if you can turn your steps this way.

I remain with many good wishes,

Very truly yours,
(Signed) George Du Maurier.

I prize this letter very greatly, and am only too sorry that I did not have an opportunity of going to see Mr. Du Maurier and making his acquaintance. I still think that Peter Ibbetson is a greater book than Trilby, although the general public caught on to that book more than they did to his first book; but there is to my mind no inner meaning about Trilby, whereas in Peter Ibbetson

¹ This no doubt referred to Trilby, of which, of course, I then knew nothing.
there is much food for thought, and the whole book is full of beautiful poetical imagination.

In the early spring of 1896 I was not at all well, but after a short holiday felt better. On Christmas Eve of that year a somewhat serious catastrophe happened to a big sewer I was engaged in enlarging. Owing to excessively wet weather, this sewer became surcharged in the midst of the operations, and a bad fall of earth took place and completely choked it. A valley became flooded and considerable damage was done, although there was no loss of life. I was at work continuously day and night through excessively wet and cold weather, and consequently I became rather seriously ill with a bad attack of rheumatism. In February, 1897, my doctor ordered me to Bath, where I went for three weeks and I came back better; but I did not feel at all well and in September I reluctantly sent in my resignation. The Health Committee were most kind and considerate, and offered to give me a long holiday in which to recover my health and also an increase of salary, but I felt rather unstrung, as my twenty-five years of strenuous municipal work had begun to tell on me, and consequently I adhered to my resolution, feeling that "a live dog is better than a dead lion." I had intended to come to London and start in private practice, but curiously enough, just at this juncture I was offered an appointment as one of the engineering inspectors at the Local Government Board and I accepted it, though of course it was a very great drop in salary. I knew, however, that the work would be congenial and not too heavy, and as health is of far more importance than wealth, I think I came to the right conclusion, especially as I did not sever my lifelong connection with municipal engineering. The Health Committee on my retirement, passed the following resolution:

"Resolved that the Committee receive with much regret the resignation of Mr. Boulnois, and desires to record their high appreciation of the able, courteous and faithful manner in which he has performed the onerous duties of his office during the eight years he has occupied the post of City Engineer of Liverpool."

This resolution was afterwards engraved on a framed illuminated "parchment" and presented to me and now hangs on my walls as a memento of a strenuous time carried out to the best of my ability.

On my retirement becoming known I was the recipient of a large number of beautiful presentations. My staff gave me a magnificent chased silver inkstand with a blotter and large ivory and silver paper knife, my brother officials an Irish silver rose bowl,
and the Liverpool Engineering Society and the United Club, conjointly, a splendid service of silver plate consisting of coffee and teapot, cream jugs, large silver salver, a magnificent silver bowl and an illuminated framed address, together with a beautiful silver mounted toilet set for my wife, while the workmen in my department gave me a clock with two side ornaments. The men managed the whole affair themselves, and one Saturday afternoon just before I left I received the presentation. They had erected a covered dais in the yard (it rained heavily at the time), and there was a mover and seconder of an address which was admirably worded. There were many hundreds of men present and I had to shout to be heard, but I felt the occasion very deeply and was greatly touched by this spontaneous offering of affection, and I was able to speak from my heart. It was a moving scene which I have never forgotten or am ever likely to forget. The men at the destructor works gave me a cigarette case, and the foreman who made the presentation said, I am afraid with truth, "We didn't at first know what we should give the governor that he would like, till someone said, why he's hardly ever without a cigarette in his mouth when he pays us a visit, so give him a cigarette case; so we at once agreed to that."

The captains and crews of the Alpha and Beta gave me a handsome writing-desk, and in presenting it, Captain Griffiths, of the Alpha, paid me the highest compliment I have ever received in my life, he said, "I and my mates wished to give the governor something to remind him of us, and we've got this writing-case, on which is put: Presented to H. Percy Boulnois, M.Inst.C.E., and some other letters, but if I could have had my way, what I should like to have put would have been 'H. Percy Boulnois, Esq., Gentleman.'" Coming from such a source amply repaid me for my endeavours through life to be courteous to everyone whether Duke or Dustman.

So, with all these kindly and substantial tokens of friendship and goodwill, I left Liverpool to take up my fresh field of duties.

1 Some time after I had left Liverpool, this splendid specimen of a sea captain was drowned in the mouth of the Mersey after an unavoidable collision in which his vessel the Alpha was sunk.
CHAPTER VIII
THE LOCAL GOVERNMENT BOARD

On December 1, 1897, I took up the appointment of one of His Majesty's engineering inspectors of the Local Government Board. When I joined, the following were the staff of engineering inspectors:—

Major-General C. Phipps Carey, R.E., chief engineering inspector.
Col. J. O. Hasted, R.E., deputy chief engineering inspector.
Rienzi Walton, M.Inst.C.E., second deputy chief inspector.
Col. C. H. Luard, R.E.
Major-General H. D. Crozier, R.E.
F. Hector Tulloch, M.Inst.C.E.
G. W. Willcocks, M.Inst.C.E.
Col. J. T. Marsh, R.E.
Col. W. L. Coke.
R. H. Bicknell, M.Inst.C.E.
W. O. E. Meade-King, M.Inst.C.E.
W. A. Ducat.
Herbert Henry Law, M.Inst.C.E.
H. Percy Boulnois, M.Inst.C.E.
E. A. Sandford Fawcett, M.Inst.C.E.

This is only twenty-three years ago, and of these only four are left, viz.:—Mr. H. H. Law, who is now chief engineering inspector, Mr. Fawcett, Mr. Tulloch and Mr. Meade-King.

Mr. Willcocks became chief inspector whilst I was at the Board, but retired a few years after I did, and died in 1918. Mr. Bicknell retired more recently, and is in private practice as an engineer; all the others have passed over to the great majority.

There were then in addition, the following temporary Inspectors:
Col. Arthur George Durnford, R.E.
Col. William Randall Sleak, R.E.
Col. Albert Charles Smith, R.E.
Col. Albert James Hepper, R.E.
I found the work of a travelling inspector very pleasant and exceedingly interesting, as it enlightened me as to localities, works, and people. For the first time in my professional life I had no executive work to worry me, and as I had been actively engaged on most descriptions of work on which I held my inquiries, I did not find any insuperable difficulties in writing my reports.

Perhaps it might be well to explain here what are the duties and general work of an engineering inspector of the Local Government Board.

When any local authority requires to borrow money in order to carry out any permanent work, and the sum proposed to be borrowed with any debt balances exceeds their assessable value for one year, a local inquiry has to be held whether the amount is small or large, before any consent of the Board can be given, and there are many other cases where local inquiries have to be held, or a visit paid, by an inspector. Consequently, applications to borrow specific sums are duly made accompanied by the necessary plans, sections, estimates of cost, etc., as well as full particulars of the proposed works, and the ball is set rolling. After more or less correspondence, the "case" is ready for inquiry and the "file" is duly marked, "Mr. Blank for Inquiry."

On every alternate Monday, a batch of these files, so marked, are placed on the inspector's table, and he marks the date, and hour, at which he will hold the respective inquiries, having arranged after a careful search of Bradshaw, how to fit them in. He fixes these inquiries for a fortnight ahead as he has to start on that day to hold the inquiries he had fixed on the previous Monday fortnight. He naturally also has to allow a week for writing his reports and a week for holding the inquiries. Hence the necessary fortnight.

After duly struggling with Bradshaw and fixing the dates and hours, he generally has to rush off to catch a train in order to commence his inquiries on the next day. The days for these inquiries have necessarily to be Tuesday, Wednesday, Thursday, Friday, and very occasionally Saturday, and the hour ranges between 10 a.m. and 12 noon for commencing them according to the train service. What are known as "housing" inquiries, have to be held after 6.30 p.m. in order that the working man shall have a chance of attending them, otherwise the hour is left to the inspector's discretion and "waybill." It is usual to hold only one inquiry at any place, but sometimes other files follow the inspector by post, and I have sometimes started, with only one file, for a certain place, but before I held the inquiry, 5 or 6 more files would follow, and they all had to be taken at the inquiry. This sometimes was very
inconvenient and made it necessary to travel very late at night in order to reach the next place in time for the inquiry in the morning. When the inspector has fixed the date and hour for his inquiries, the "office" at once sends notice of this to the local authority, who forthwith issue these printed notices, which have to be prominently displayed on church and chapel doors, and in markets, Town Halls and other public places. One of the first questions which the inspector asks at an inquiry is for a proof, or statement by the Town Clerk, that these notices have been so exhibited, and a sort of affidavit signed by the billposter that he has done so, has to be sent to the Board. The form of notice, in my day, and I think it is the same now, was as follows:—

THE PUBLIC HEALTH ACT, 1875.

DODBOROUGH.

WHEREAS the Town Council of the Borough of Dodborough have applied to the Local Government Board for sanction to borrow £10,108 for purposes of Street Improvement and £9,820 for works of Sewerage; and the Local Government Board have directed Inquiry into the subject-matters of such Applications.

Notice is hereby given that H. P. Sionluob, M.Inst.C.E., the Inspector appointed to hold the said Inquiry, will attend for that purpose at the Town Hall, Dodborough, on Wednesday, the first day of November, 1899, at half-past ten o'clock in the forenoon, and will then and there be prepared to receive the evidence of any persons interested in the matters of the said Inquiry.

B. S. SIVORP, Secretary.

A large number of these inquiries are merely formal, no one but the officials and members of the Council attending; but sometimes there is very strong opposition, counsel are briefed, and the proceedings are then protracted and complicated.

As the inspector is expected to hear the evidence of "any persons interested in the matters of the said inquiry," it was sometimes difficult to decide whether a garrulous objector had a real locus standi or not, but it was, as a rule, better to hear him quietly without interruption unless he was too long-winded, in which case an appeal not to waste his time and yours was generally sufficient. I once held an inquiry into an application for a loan from a rural authority in the midlands. In the morning before the inquiry I had to inspect various small sewage disposal works scattered all over the place. The surveyor drove me in a dogcart in a driving snow blizzard and the inquiry was to be held in a small roadside public-house. The surveyor had kept out the cold with oft-repeated
libations, and to my horror after opening the inquiry, I found that nearly all the "audience" and most of the witnesses were inebriated; the inquiry was a short one, and I was glad when it was over. Needless to say that my report was not very favourable towards granting permission for a loan. I am glad to be able to say that this was the only instance of such an occurrence during the whole time I was at the Local Government Board.

Inquiries for loans for housing the working classes were as I have stated held in the evening, so as to allow the working man to attend. These inquiries were sometimes very trying as local feeling often ran very high, and on one occasion the proceedings became so riotous that I asked the Town Clerk to send for two policemen and I suspended the inquiry till their arrival. I instructed these two stalwart officers to place themselves amongst the audience, and gave them instructions to eject anyone who created a disturbance. I am not sure that my action was legal, but it had the desired effect, and I was able to finish the inquiry without further interruption.

On the whole, however, these inquiries were by no means unpleasant, they required very concentrated attention and some acumen to sift useful evidence from that which was irrelevant, but one knew what one wanted for the purposes of the report one made to the Board and my long experience of municipal work and engineering greatly assisted me.

Fortunately also a sense of humour protected me sometimes from feeling the trammels of red tape too seriously, and on the whole I can safely say that there are many worse appointments than that of being one of H.M. Local Government Board engineering inspectors. I was very sorry when I was promoted to the position of a deputy chief engineering inspectorship, as it meant no more inquiries, no more travelling, and only the routine and hard work in the office, of minuting, criticising inspectors' reports, and the innumerable and irksome duties of such a position.

Needless to say that the officials of the Board were greatly governed by "precedent." Such a word is anathema to the engineer, for were he to be bound by precedent there would be little or no advance and yet if the Board had not gone largely on precedent, it is to be feared that many local authorities would have taken advantage of any relaxation of their rules and regulations. No wonder, however, that some wag once made the following rhyme with regard to the Board when they, or rather the permanent officials, were unable to make up their minds as to a certain procedure:—
"In this case, said the Board, we confess,  
Some matters weigh more and some less.  
As the question stands so, we can hardly say No,  
But we hesitate much to say Yes."

This is rather an unfair criticism of the difficulties which sometimes arise in deciding what course to pursue in coming to a decision upon the intricate questions with which the Board has to deal, but I must confess that some of the delay arose sometimes from the drawbacks of red tape.

I kept a sort of commonplace book or record whilst at the Board of the various instructions, regulations, and conclusions which were promulgated, and many of these instructions, etc., would be of great use to surveyors and clerks to local authorities who were contemplating approaching the Board on the numerous applications and questions which arise. I have been sorely tempted to set forth these notes in detail, but if I were to do so it would extend these reminiscences to an inordinate length; and they would be difficult to arrange and group and index, without which they would be of little use.

This may be imagined when I give the following list of subjects on which I personally held inquiries or dealt with them officially whilst at the Board, many of these subjects being also split up into a large number of ramifications:

1. Abattoirs or public slaughter-houses.
2. Appeals against orders of County Councils as to alterations of areas and boundaries under the Local Government Acts 1888 and 1894.
3. Appeals against assessments of costs in connection with private street improvements.
4. Allotment grants.
5. Appropriation of unexpired balances of loans.
6. Allocations of public buildings for purposes different to that for which they were originally constructed.
7. Abandoned schemes, as to whether their cost of preparation could be included in a loan.
8. Baths and wash-houses.
10. Burial grounds, laying out of new or obtaining a closing order.
11. Bridges, of all sizes and methods of construction.
13. Cottages for workmen in the employment of a local authority.
15. Conveniences.
17. Concrete flags (manufacture by the local authority).
18. Default of local authority to supply water, or to execute
   works of sewerage in their district.
19. Depots for storage of municipal materials, etc.
20. Disinfecting apparatus and chambers.
21. Earth closets.
22. Electoral divisions.
23. Education, construction of schools, purchase of furniture,
   etc.
24. Electric power installations, extensions, etc.
25. Excess loans.
27. Fire engines and appliances.
28. Gas works, installations, extensions, etc.
29. Housing of the working classes.
30. Hospitals.
31. Horses and harness, etc.
32. House refuse disposal, destructors, tips, etc.
33. Hydrants.
34. Libraries.
35. Lunatic asylums.
36. Markets.
37. Mortuaries.
38. Public offices, town halls, etc.
40. Public parks and pleasure grounds, etc.
41. Police stations.
42. Private street improvements.
43. River and sea walls.
44. Rivers pollution by trade wastes, etc., under the Act of
   1876 and private Acts.
45. Sea defences, groynes, walls, etc.
46. Sewerage works.
47. Sewage disposal.
48. Shelters.
49. Stables.
50. Street widenings, improvements, etc.
51. Surface water drainage.
52. Special drainage areas or districts.
53. Small holdings.
54. Street lighting by gas, electricity, acetylene gas, etc.
55. Street watering by fresh, or sea, water.
56. Telephone installations.
57. Water supply.

I possibly have omitted some of the subjects on which I held inquiries and made reports, but the list, though possibly incomplete, shows the diversity of the subjects and the cosmopolitan nature of the knowledge necessary to obtain the desired information in each case.

In addition to these formal inquiries, I made a large number of informal visits, some of them surprise visits, to sewage disposal works where it was suspected things were not as they should be. Such visits were in the nature of detective work and were not congenial to me, as I felt that having been a "poacher" myself for so many years, I did not like acting as a "gamekeeper." In a great many sewage works it used to be found necessary to insert a "back door" through which the sewage could be turned on special occasions when the works were overpowered or for other reasons, into a ditch or other convenient place of disposal, and the discovery of these "back doors" was often very difficult, and when found, necessarily caused a good deal of trouble with the authorities. Visits had to be made also on sometimes rather curious inquiries, such as whether the accommodation for gangs of "unemployed" on remote works was suitable, and many other abnormal subjects. On one occasion I had to pay a hurried visit in order to ascertain whether a lady who had died and had expressed a wish before death that she might be buried in a garden adjoining a Roman Catholic chapel could be so buried without prejudicing the health of the locality. A rather curious incident occurred in connection with this visit. The priest, whose house was close to the spot where the lady had expressed a wish to be buried, was evidently opposed to the proposal. After my interview with him, I asked the solicitor who represented the friends of the deceased lady whether Father X had objected on sanitary grounds, when he said, "Oh, dear no, he objected because he feared her ghost might walk!"

At one time I held several inquiries also under the Locomotives Act, 1898, as to the stopping of certain roads against heavy motor traffic, and also on the amount of contribution payable by a local authority to a County Council for road maintenance. Such inquiries were of considerable importance at the time and were generally somewhat lengthy.

It would take up too much space were I to attempt to recount
my experiences during the thirteen and a half years I was in the service of the Board.

I reached the age for compulsory retirement in 1911, and for the first time in my life found myself with no specific occupation.

In October, 1908, the Board appointed me as "Délégué Officiel du Gouvernement Brittanique," to attend the first International Road Congress which was held in Paris, and to which I duly went. It was an extremely interesting meeting; about 2,400 delegates attended from all parts of the world. I had to make several speeches and one I made in French—which was rather an "effort"!

In the same year I went on a motor trip to Hastings and other towns in the south of England with other members of the Royal Automobile Club. We started from the club, then at Whitehall Court, in about twelve motor vehicles of various descriptions, which grunted and puffed their way over Westminster Bridge. As we proceeded through the country we frightened all the live stock, even the plough horses galloped across the fields with the ploughs bumping behind. I see that I noted in my diary afterwards that I was rather ashamed of the effect we produced, and that "sometimes we went quite 30 miles an hour!"

In October, 1910, I was appointed a Member of the Advisory Committee of the Road Board; the other members appointed at the same time were Mr. J. A. Brodie, city engineer, Liverpool, Mr. P. C. Cowan, chief engineering inspector, Local Government Board for Ireland, Mr. H. P. Maybury, county engineer of Kent, and Mr. John Willmot, county surveyor of Warwickshire.

When I left the service of the Local Government Board on March 31, 1911, my colleagues gave me a beautiful silver hot water dish, and I need not say how greatly I appreciated this mark of their friendship and good comradeship. Some of the members of the Institution of Municipal and County Engineers of which I am a past president, gave me a dinner and presented me with a magnificent "Armada" silver rose bowl, to mark my retirement from an active municipal life, and also a very handsome pendant for my wife. Mr. James Paton, the borough engineer of Plymouth, was in the chair as president of the Institution, and there was a large attendance, amongst the guests being Sir George Gibb, chairman of the Road Board, the late Sir Alexander Binnie, chief engineer of the London County Council, my old friend, Sir Arthur Conan Doyle, and many others. In replying to the toast of my health proposed by Mr. Paton in flattering terms, I reviewed my life and inter alia stated that my work in Jamaica had taught me self-reliance, my work under the Council at Exeter self-control, at Ports-
mouth, owing to the Government officials, I had learnt self-repression, and at the Local Government Board, as becoming merely a cog in the wheel of the great State machine where one lost one's individuality, I had learnt self-effacement. Sir George Gibb, in proposing the subsequent toast of the Institution, said that I must be a disciple of Socrates as I had presented in my speech a varying "curve" from a very moderate degree of self-esteem down to self-effacement, but the curve of other people's opinions would show a continuous rise from zero to a point of very high esteem. In continuing, Sir George Gibb said he had learnt from his experience at the Road Board, why it was that the local government of England was, notwithstanding many imperfections in its form, the admiration of the world, and that this was due in no small measure to the work of the municipal engineer, and that he knew of no profession on whom rested greater responsibility. This was high praise from a man who was in a position to form an opinion, and it is to be greatly regretted that the general public have not yet come to realise the importance and responsibility of this profession.

Thus, after forty-one years of strenuous life devoted to municipal engineering, I laid down the cares of official work and became free to spend the remaining years of my life in accordance with my "own sweet will."
On leaving permanent employment I at first felt rather like a "fish out of water," but I determined not to be idle, and at once took an office at 7, Victoria Street, Westminster, and put up the usual brass plate, and started a consulting practice. I made up my mind (1) that I would not give evidence against a local authority except when acting for another local authority. (2) That I would have nothing more to do with executive work, as it was too troublesome. I have scrupulously kept the first resolution, but with regard to the second, circumstances have in some cases been against me, and I have had to design and carry out certain works, though none of them of great magnitude or importance.

My first professional engagement was that of expert witness for a County Council in an extraordinary traffic case, which we won, receiving within £25 of our claim! I have been in a number of such cases with very varying results. It is proverbial that the law is very elastic in such matters, and one never knows until judgment is given in what manner the case may end. I had altogether twenty-one cases of various descriptions in 1911, the year I left the service of the Local Government Board, this including sitting as arbitrator in one very important case for 42 days, the proceedings running into the year 1912. Several eminent counsel were employed and altogether it was a very arduous and difficult work, and I was glad when I was able to deliver my award, which was of great length, in the spring of 1912.

This latter part of my life is too recent to be at all interesting, and it would only weary my readers if I gave any recital of the various cases or works on which I was engaged; suffice it to say that they were numerous, and I had no cause to complain of want of work. This lasted for about three years and then, in August, 1914, the great war broke out. This naturally stopped all work and, except for a few cases in Court and other small matters, my remunerative work practically ceased, and my energies were turned to voluntary activities.
Looking back on my life I can safely say that most of it has been spent in useful work, though, undoubtedly like many others, I could have done more.

I never had a hobby unless reading and occasional literary efforts come under that category.

I once started golf, but came to the conclusion it was a waste of time and energy, and did not lead anywhere even if one became champion of the world! When I came to this conclusion many years ago, I wrote, for my own edification only, a short poem on "The Use of Life." The following are a few of the lines:

"Where are the days we have wasted,
What of the hours we have lost.
Have we kept count of the minutes,
Do we quite reckon their cost.
Life is a treasure that's lent us,
How have we dealt with that trust,
Has it lain hid in a napkin,
Is it half buried in dust.
What have we done with our talents,
Have they been used day by day,
Or left unregarded, uncared for,
Derelicts, floating away.

The above lines may sound rather sententious, but if everybody put out their best efforts, the progress of the world would be phenomenal.

I once started a hobby of collecting English china, or porcelain, but when I brought home five little unglazed Derby figures about three inches in height which had cost me about £5, my wife put a stop to it!

Thus I fell back on literature as a partial hobby for my spare time. So far as I remember my first effort, which appeared in print many years ago, was the following little rhyme:

"One—Two, a House that is new.
Three—Four, 'To Let' on the door,
Five—Six, the Builder's tricks.
Seven-Eight. We'll put them straight.
Nine—ten. Employ some men.
Eleven-Twelve, to dig and delve.
Thirteen—Fourteen, arranging, sorting.
Fifteen-Sixteen, from Attic to Kitchen.
Seventeen-Eighteen, the bad work abating.
Nineteen—Twenty. The House is still empty,
Pray, Mr. Gladstone, give us some laws,
By which we may escape the Builder's claws."
LITERARY WORK AND CONCLUSION

The appeal to the Grand Old Man dates this effusion somewhere in the seventies. I have written and given a large number of lectures. I have written a number of pamphlets on professional subjects as well as several books, but these are all dry stuff and cannot be called recreation. Some of my books brought in a little grist to the mill, but as an American writer once said: "Literature is a pretty good walking-stick but a poor crutch"; which is true:—

But in addition to my books and pamphlets, I have written occasionally in the lighter vein. One of my early efforts was a series of ten "Professional fables after Aesop," which appeared from time to time in The Surveyor, a weekly paper devoted to the work of the municipal engineer.

I give the following examples of these fables:—

THE OLD HOUND.

"A Surveyor, who had been an excellent one in his time and had done good service to his corporation in the many improvements of their district, at length became worn out with the weight of years and trouble. One day, when prosecuting a Jerry Builder, his memory gave way and the creature escaped. Upon this the corporation severely rated him. But the feeble surveyor replied, 'Spare your old servant. It was the power not the will that failed me. Remember rather what I was than abuse me for what I am.'"

Moral:—Ingratitude is as blind as it is base.

THE SETT AND THE RAMMER-MAN.

"A hard Paving Sett was being driven into its place by a vigorous Rammer-Man. 'Why do you beat me so furiously?' groaned the Stone as he gradually settled into his place, and he prayed that Jupiter might soften the man's heart and treat him more tenderly.

'If you are not well beaten,' replied the Rammer-Man, 'you will not be firmly set and will lose your situation,' but, at the intercession of Jupiter, he relinquished his blows and left the foolish Sett to its fate.

The traffic quickly loosened the Sett from its grouting, and the Inspector condemned it to pass through the stone-breaker, from which it emerged so changed in appearance that its friends no longer knew it, and it was treated as mere Macadam.'

Moral:—"Spare the rod and spoil the child."

1 From time to time I have written the following: The Municipal and Sanitary Engineers' Handbook, Sewer Ventilation, Dirty Dustbins and Sloppy Streets, Housing the Working Classes, The Disposal of Town's Refuse, The Construction of Carriageways and Footways, Practical Hints on Taking a House, A Glossary of Road Terms, and finally Modern Roads. All the above books are now out of print except the two last mentioned.
THE BAD BOARD AND THE SULKY SURVEYOR

"A bad Board, rather more wooden than usual, fell to loggerheads with its Surveyor as to some rumoured smells from a Sewer Ventilator, which the Surveyor indignantly repudiated. At last, stung by the many taunts, he secretly caused the Ventilator to be hermetically sealed, and then turned sulky when the taunts and reproaches were renewed and declined to bandy arguments on the subject. A special chunk of that Wooden Board examined the Ventilator, and, having found it sealed, became the sport and jest of a section of the ratepayers. But as to the Sulky Surveyor, the Board incontinently sacked him."

Moral:—Never run your head against a Brick Wall—or a Board, for the matter of that.

When the bacterial treatment of sewage was just beginning to be acknowledged by Engineers and Analytical chemists as the right method of purification, I wrote the following poem:—

"A SPORADIC PASTORAL."

"A Microbe on the sewer's brim,
A Microbe only was to him
A Microbe, nothing more."—After Wordsworth.

"A Microbe basking in a septic tank,
Raised his wee voice aloud, the gods to thank,
That man at last awarded him the palm
Of merit for his useful work; a balm
To injured feelings. Centuries of blame
Had he encountered; every name
Of odium flung at him; a hero in disguise,
Toiling for good amidst abusive cries.
But now, how vast a change! our praise is sung,
Wherever wags the scientific tongue.
No longer vilified with micro-obliquous terms,
We're styled the useful nitrifying germs.
'Tis true that certain black sheep taint our grace,
But so it is amongst the human race.
Enteritidis, Staphylococci, Mensenteric spores
Have prototypes in man; the knaves and bores
There always will be good and bad in life,
The World of Nature is a world of strife.
We share, we microbes, in this vital war
We ask for common justice, nothing more."

I have always considered that this was the best poem I ever wrote, or as some of my readers may think, it is the least bad one.
I was, as has been stated elsewhere, at one time president of the Institution of Municipal and County Engineers, and have been a member since its formation in 1874. The Institution is accustomed to have meetings, to discuss papers and inspect works, in all parts of Great Britain and also abroad, and after one of these excursions to Paris, I wrote the following poem, strictly following the programme of the proceedings, as follows:—

A certain Monsieur President and a certain Monsieur Cole
Determined on a little trip, and Paris was their goal;
So forthwith all arrangements were made with Monsieur Cook,
And we, " the Institution," did our " billets " promptly book.
At " l'Hôtel de Ville " of Paris, where we met in solemn state,
We gazed at " salons magnifiques," which were almost too ornate,
And we listened with amazement to a " discours en Français "
Which Monsieur Cole did give us, and then we said, Hurrah.
" Nous buvions à sa santé," and then 'twas " en voiture,"
To see a ' Buthilitique ' road, " la poussière " to cure.
Next day we all went underground, " les égouts " to explore,
And then we went to Montsouris to see a Reservoir
And after our " déjeuner " at the Paris-Lyons Station,
We inspected, at the " Saint Maur " works, an " Ozone " installation
For ' l'épuration de les eaux," drawn from the River Marne,
This process, plus some violet rays, to keep all germs from harm.
Sunday was wisely left alone " for individual action;"
What members did I do not know, but Monday saw reaction.
But, notwithstanding, off we went to see the Electric Works,
A " grand déjeuner " at Lafitte, a meal which no one shirks.
And then " en voiture " once again, inspecting, whilst " en route,"
A model sewage treatment plant—a great success " sans doute."
On Tuesday we were photographed; we all looked very nice
[The Surveyor published this last week; six pennies is the price].
Then " sous terrain " again we went, the " Underground " to see.
The " Nord-Sud Paris Underground," which one and all agree
Was splendidly constructed, " un succès tout à fait."
The engineers we compliment, and then we drive away.
The next thing we inspected was quite " une autre chose,"
Called " Paris Dust Destructor Works," where critics fierce arose.
Why is this " ordure " not destroyed, but merely " messed about "
By men and women and machines?—" une failure triste sans doute."
" Un petit oiseau " then replied, " 'Tis due to Politics!"
But what can refuse have to do with Socialistic tricks?
We came away disheartened " ce n'était pas la guerre,"
" Ce n'était pas économique, ce n'est pas sanitaire."

1 Thomas Cole was Secretary of the Institution at the time, and was greatly beloved and respected by all the members. He died in 1919, after 38 years of whole-hearted energies devoted to the Institution.
We hurried off to Landy the Gasworks to inspect,
But we were rather tired and worn—what else could you expect?
But at our parting dinner that night at the "Lazare"
We drank the healths of all our hosts with many a loud "Huzza."
We felt we had enjoyed ourselves; long live "La France si belle,"
Long live the Institution, and the "entente cordiale."

Municipal Engineers will realise how much they sometimes suffer from gas companies, water companies and other "bodies" who break up their newly-made streets, and I am consequently tempted to give one other specimen of my poetry, which shall be the last but one that I will quote. It is as follows:

THE TALE OF A NEWLY-MADE ROAD.

Scarcely had the roller left it, left it a compacted mass,
Than a dark-browed man surveyed it, said there was a smell of gas—
Sent for ruthless men who dug it, dug it out in trenches wide,
Filled these chasms up at random, caring not if they'd subside.
Forthwith came a gaunt inspector, said a water-main had burst,
Followed suit, and dug more trenches—of the two he was the worst.
Not content with this destruction, came there forth the engineer
Of the electric light department, who was quite a pioneer;
Saw his way to get "consumers," said he'd lay a cable there,
Ripped the road right up the centre, laid its very bottom bare.
The surveyor when he saw this, saw this wreck of months of toil,
Wondered why the law allows it, thus a brand-new road to spoil;
Said things not quite parliamentary—can one wonder that he swore?
Asked himself pathetically, Why was this not done before?
Quoth the Raven—'Never more!'

I have always felt that after-dinner speeches are the most difficult form of speaking, as they require to be, if possible, bright and amusing, and I have often doubted if anyone wants to give them or anyone wants to hear them.

Someone has given the following advice to after-dinner speakers:
"Stand up, speak up, shut up," and if everybody followed this advice, there would be less boredom at public dinners.

One of the best speeches in this connection was given by the late Sir Frederick Bramwell who had to reply to the toast of "Science and Art" at a big public dinner. The speakers who preceded him were very long-winded, and he did not rise to reply till a rather late hour, when he said: "At this late hour, gentlemen, I think the sooner we apply the match of Science to the candle of Art and go to bed, the better." The late Judge Rentoul was an excellent after-dinner speaker, and his Irish accent and cheery manner were
very telling. He was a difficult man to follow, and unfortunately on more than one occasion this fell to my lot. At a dinner of "The Association of Engineers-in-Charge," I once followed him, and fortunately had prepared a little parody on Sir Walter Scott's "Lay of the Last Minstrel," which I weaved into my speech, and which was very well received. It was as follows:—

"The draught was wrong; the feed was cold,
The boiler was infirm and old,
Its withered plates and fretted stay,
Seemed to have known a better day:
Its gauge, its sole remaining joy,
Was broken by an awful boy.

* * * *
No more with steam at pressure borne,
It whistled loud as lark at morn
No longer courted and caressed,
High pressure steam it bravely pressed.
Old times were changed, old manners gone,
A stranger filled the engine-room."

On one occasion at a dinner where there were several lawyers, a few barristers, and a number of "expert witnesses," I brought in the following story, which may by this time be a chestnut, but was then quite new:—

"Old Nick complained to St. Peter one day that the floor of heaven was wearing out and that the occupiers of Paradise peeped through the holes and jeered at the occupiers of Hades. St. Peter contended that this was the roof of Hades and not the floor of Paradise. After a long jangle old Nick suggested an arbitration which St. Peter accepted, and the Arbitration was fixed for a certain day. The day arrived. Old Nick was ready with his Counsel, his Lawyers, and his skilled witnesses, but no signs of St. Peter or his lawyers or witnesses. Presently St. Peter rushed into the Court, and cried out: "The Arbitration is off. I've been all round my place and I can't find a single Lawyer, Barrister, or skilled witness."

The roars of laughter which followed this story was evidence that the guests thoroughly appreciated the sally and bore me no malice for the "soft impeachment." In addition to the examples I have given of my more, or less, professional efforts in the literary line, I have for recreation also written a few stories for newspapers and magazines.

The following is an example of one of my efforts which was published in the Hampshire Telegraph, some thirty years ago:—
ULVERSTONE OF ULLSWATER.

What induced Dick Ulverstone to bury himself in a tiny cottage at Shepherd's Cove on the banks of Ullswater was a profound mystery to all his friends.

Dick had been decidedly gay in his youth, and having been born with a silver, if not a golden, spoon in his mouth, he had been able ever since to enjoy his life as best it pleased him. Of late years he had travelled to the utmost confines of the earth, especially in the East, where rumour had it that he had seen some strange sights and picked up a great deal that was curious and weird about theosophy and reincarnation and mahatmas, and a great deal more which puzzled his friends at home when he ventured to speak to them of his experiences, which he seldom did, and very soon ceased altogether when he found that they only jeered at him; and now he had altogether perplexed them all by suddenly disappearing again, and their hearing of him not at Thibet or Lassa, but in the picturesque English lakes. Dick Ulverstone not only puzzled his friends by this movement, but he mystified the rustics in the neighbourhood of his cottage, for he furnished the tiny, low-ceiled rooms in the most splendid Oriental fashion. When he arrived he was accompanied by half-a-dozen vans from the pantechnicon and a dozen men, who disgorged from the vans, and carried into the cottage carpets and furniture such as the villagers had never dreamed of, and only those who had read the Arabian Nights tales could have imagined.

In a few hours the work was over, and Dick was left alone in his glory—not quite alone, for he had brought with him a curious specimen of humanity, a little Tartar boy, whose dark skin, soft dreamy eyes, and quaint dress were a further source of curiosity to the yokels.

This was, however, the only glimpse they got of this human curiosity during Dick's sojourn at Shepherd's Cove, for though they often met "Maister Oolverstoone," as they called him, climbing almost inaccessible parts of the neighbouring fells, they never again set eyes on his little serving man or companion, or whatever he was.

That he was not an ordinary menial, however, was evident from the fact that Ulverstone had secured the services of an old woman to come in daily to do the staring and the modicum of cooking which was required in the small household, but she soon set her cronies' tongues wagging by her description of what she called the "goings on" of the occupants of the cottage.

"They eats no butcher's meat," she said, "and naught else but bread and vegetables, which they washes doon wi' milk, but they smokes baccay wrapped oop in paper the ole blessed day. There be devil's woork too in t'house, I'm sartain sure, for Maister Oolverstoone he be allers a making signs with his hands over t' nigger's head, and then t' nigger, who is most times quite silent, shoots his eyes and begins to jabber awful like in a strange tongue."
These stories soon reached the Vicar’s ears, and he determined to call upon these strange temporary parishioners. He was ushered into a room which made him feel for an instant as if enchantment had been at work. The dim light shone through coloured-glass windows which had been dexterously fitted behind the frames of the ordinary cottage windows. The walls and ceiling were hung with priceless Oriental stuffs, the floor covered with beautiful mats whereon divans and cushions were arranged, whilst carved screens, judiciously placed, with dim lights burning behind them, filled with perfumed oil, imbued the Vicar’s mind with a mystic sense of awe.

He was alone for a few minutes, and he glanced at a well-filled bookshelf, in order, as was his habit, to judge of the owner’s mind by his books, and he noticed with interest, as he was a student himself, that they were nearly all Roman Histories, Histories of England, and innumerable Latin authors; whilst on a splendidly inlaid Moorish table was laid out a curious old map of England, evidently in connection with the Roman Conquest of Britain.

Ulverstone at this moment entered the room, and the Vicar began and carried on a general conversation, in which he was deeply impressed with the research and learning of this strange visitant to his quiet district.

Ulverstone talked but little, and gradually drew the Vicar into a conversation about the neighbourhood and the history of its past, which the Vicar was very glad to unfold so far as he knew it, though the neighbourhood had very little past history except the merest traditions of its occupancy in the time of the Romans.

"You know, perhaps," said the Vicar, "that not many miles from here our Roman conquerors built for themselves the nearest approach to a large city that they constructed in England, and curiously enough, although no trace of this city exists, there are still traces of the road or street which was supposed to pass through it, and the city was built on a considerable eminence, in fact, on one of our highest mountains, which is still called "High-street," and the marks of this street are still plainly visible. There is also an absurd rumour, for which there cannot be the slightest foundation, that this great Roman city was entirely destroyed with all its inhabitants in one single night by a huge monster, which silently emerged from Ullswater and retired thereto again after completing its work of destruction."

Ulverstone seemed to the Vicar to be more attentive to this part of their conversation than to any other, though they talked long and earnestly upon many subjects, and when he at last rose to go Ulverstone regretted that the time had slipped by so quickly and trusted that when he returned the Vicar’s call he should find him at home.

This was the last that was ever seen of Dick Ulverstone upon this earth alive; his dead body was found by some shepherds the next morning upon the summit of the High Street Mountain, and the little Tartar lad was never seen again.
At the inquest the only evidence that was given was that of the two shepherds, who had found the body lying on its back, with a calm and even happy expression upon the face. The doctor, who had been hastily summoned, said he had most carefully examined the body, and could find no traces whatever of violence, and subsequently (after an adjournment for the purpose) no trace of poison or disease to account for death. The old charwoman, who had left the cottage as usual the night before Ulverstone's death about nine o'clock, had left him writing at his desk, with the Tartar boy apparently lying in a deep sleep upon an adjacent divan, and could give no further information. The Vicar described his visit to the deceased man that afternoon, and spoke of him as apparently in perfect health and spirits, and not in the least depressed or contemplating suicide. The Coroner, in summing up, pointed out to the jury the mysterious life the deceased man had led, and the curious fact of the disappearance of his foreign companion, and after a long sitting the jury were only able to bring in a verdict of "Found dead by the visitation of God." Ulverstone's friends arrived, the body was buried, and the nine days' wonder soon ceased to be talked about all over the country.

It was from the Vicar that I heard the sequel of this most remarkable story. Some months after the events which have been narrated he was taking one of his usual constitutionals up a track which led to the High Street Mountain, when in a clump of ferns close by the path he observed a book with a scarlet cover. On picking it up, he found that it was Ulverstone's diary, which he had kept whilst at Shepherd's Cove, and the contents were so curious that the Vicar hurried home and shut himself up in his library, where he read it through, although the task took him all night and well into the next day.

The Vicar was a theologian, and a student of no mean order, and as strictly orthodox as the Broad Church views he held would permit; but he told me, as his oldest friend, that the perusal of that diary had changed many of his thoughts, and he believed he was the better and wiser man for it, though, said he, "I cannot bring myself to the belief that Ulverstone really died from any supernatural causes, but that the intense excitement of his feelings acting upon a highly nervous temperament caused him to lose his life from some failure of the vital organs of his body."

The diary chiefly contained accounts of Ulverstone's experiments in hypnotising or mesmerising his Tartar attendant, whom he had picked up in Thibet, owing to the extraordinary mediumistic powers which this small specimen of humanity possessed, and which powers Ulverstone had evidently developed to an extraordinary degree, especially on the lines of the reincarnation theory, which he so strongly believed, and the results of certain séances which were set forth in full in the diary were of a most remarkable character. It was, however, the last pages of the diary, which Ulverstone had written the night before his death, that hinted at the reasons for the sudden removal of his
soul from his body, but no light whatever was thrown upon the dis-
appearance of his companion, which must ever remain a mystery.

The conclusion of the diary was as follows:—

"Whatever may happen to me before sunrise to-morrow morning, I should be lacking in my duty to my fellow-men were I not to set forth in this my diary all that has occurred since the Vicar's departure this evening, and this account I shall carry with me, in order that it may be found on my body should the experiment I am about to try prove fatal.

"I have fully set forth in these pages from time to time how belief has gradually settled into conviction that man's appearance on this earth is not the first or the last, that as eternity has been, is, and shall be, there can be no finite goal to which the soul of man can attain, but that as we see all around us the evolution of material things so must man's soul or spirit rise from a low degree, higher and higher, by slow evolution, till it reaches such conditions as our poor finite minds cannot contemplate. Thus reincarnation becomes a necessary law, and it is through the higher teaching from the soul of my little Tartar friend, when set free under the magnetic influence which I am able to bring upon it, that I have learnt much that is known amongst those who are waiting in Karma Loca to clothe themselves once more with flesh upon this earth. It was only this evening, however, that I learnt from him some of the story of my past self during my former incarnation. Hints had been given me of late, and I had been able, though in the flesh, to assist those hints by study of the past, and by coming to the neighbour-
hood where a large portion of my former life was spent, and now to-night I have learnt all from the lips of Ning-Foo, and shall be able to prove it before the dawn of another day.

"It is remarkable how rumour often bears a smattering of the truth; the Vicar's story to-day about the Roman city was not far wrong, except that it was built close to what was then the lake, and disappeared into its depths one night with all its inhabitants, myself amongst the number, by a sudden landslip, owing to the undermining action of the water. Hence the rumour of the monster from the lake having destroyed the city. I have known for some time back that I was a Roman centurion in my last incarnation upon earth, and that at the age of 20 I had followed Julius Caesar in his conquest of Great Britain, but the exact locality where I had lived and died in this island was only revealed to me an hour ago by Ning-Foo. It is strange how more than once during my recent explorations of the surrounding falls I have suddenly become convinced I had been there before, a flitting, curious sensation that I was living over again what I had previously been through, a sensation only lasting an instant, and leaving behind it a longing to know more or to recall further impressions of the past.

"To-night I shall have an opportunity of going back into the past. Ning-Foo has told me in exact words how I am to proceed, in order that for a few hours I may live the past life again and surround
myself with the companions of a bygone time. I have been warned that there is the greatest danger in the attempt, for the soul thus sent back through the long ages that have passed may never be able to again rejoin the material envelope which it has to employ in this planet, but on the contrary, may be attracted as it were back to Karma Loca, and wait till the laws which govern everything brings it either again to this earth or forward elsewhere on its everlasting career. To-night Ning-Foo tells me the conditions are favourable, and I am determined to make the attempt. If I succeed I will enter in detail the methods which have to be employed in order to achieve the success I anticipate. If I fail, well, the world will have to wait till some other investigator succeeds in solving the problem I am now setting forth to attempt."

Here the diary ended, and, as the Vicar quaintly observed to me, "Requiescat in Pace."

I once wrote a "Play in one Act," as a skit on a Local Government Board inquiry, but I never offered it to a theatre manager for the reason I knew it would not be accepted! I really wrote it for my own amusement, and as a skit on such proceedings. I now give it for the benefit of anyone who has ever attended one of these inquiries:—

THE LOCAL GOVERNMENT BOARD INQUIRY.

A Play in One Act.

[Dramatis Personae.—The inspector, the town clerk, the surveyor, the mayor, sundry members of the Town Council, some ratepayers, reporters, etc. Scene.—A council chamber.]

The inspector discovered in centre, sitting on high in the mayor's usual seat. He is busy with various official bags and bundles of papers tied up with red tape. The town clerk is sitting at a long table surrounded by law books and papers. The surveyor is seated near him and is poring over some large plans, an assistant hovers near him with various scales, dividers, etc. The mayor and members of the Council are seated expectantly at the table. The ratepayers are gracefully grouped at the end of the room.

[A distant clock strikes eleven.]

The Inspector: Mr. town clerk, it is 11 o'clock, please read the notice.

The Town Clerk (rising, reads the notice as follows, in measured tones): "Public Health Act, 1875. Whereas the Town Council of the Borough of Spendrate have applied to the Local Government Board for sanction to borrow £50 for the provision of a town pump within the Market Square of the said Borough, and the Local Government Board have directed inquiry into the subject matter of the said application, notice is hereby given that Y. Z. Redtape, Esq., the Inspector appointed
to hold the said inquiry, will attend for that purpose at the Council Chamber, at Spendrate, on Wednesday, April 1, 1888, at 11 o'clock in the forenoon, and will then and there be prepared to receive the evidence of any persons interested in the matter of the said inquiry." (To the Inspector): That notice, sir, has been duly posted and a certificate sent to the Board; but, if you wish, I will call Oliver Stickphast, the bill-poster, to prove the posting.

The Inspector: You need not call him, that is quite sufficient. (Then, in a loud voice): Is there any opposition to this application from anyone here?

A Ratepayer (rising excitedly): I should think there was opposition. The council haven't no business to go in for this 'ere expenditure.

The Inspector: Very well, I will hear you presently. Is there anybody else opposing?

On this a number of persons rise and begin violently gesturing, and, so far as they can be heard, their grievance appears to be that "the council are bringing the town to ruin."

The Inspector: Order! Order! I can't hear you all at once. Please let one of your number represent you, and I will hear him.

(After a pause and much talking together, one of the objectors rises and says that he has been chosen.)

The Inspector: Your name, please, and are you a ratepayer?

The Man (excitedly): I should think I was a ratepayer. Why, me and Tom Jennings are the largest ratepayers in the town. I remember——

The Inspector (hurriedly): Yes, that will do; I will hear you presently. What is your name?

The Man: My name is John William Bouncer, and I have lived man and boy in this town for——

The Inspector: Very good. I have taken your name and will hear you presently. Now, Mr. Town Clerk, I will hear you in support of the application.

The Town Clerk (rising with the air of a King's Counsel): May it please you, sir, this is an application for sanction to borrow £50 for the purpose of constructing a pump in this ancient and loyal Borough. The amount, sir, may not appear to be large, but the necessity is great. The pump is required for the growing needs of this enterprising and progressive town. It is believed to be required by every right-minded citizen. (Cries of dissent from the end of the room.) It is required for the use of those persons to whom ablution is more than a mere name, and to whom water is more than a luxury. The council have acquired the gasworks, the tramways, the cemeteries and in fact everything except the water supply, which does not at present exist; and they would be lacking in their public duties if they did not seek to provide the inhabitants with that requisite necessity and public ornament—a town pump. [And a great deal more to the same effect.]
At the conclusion of his speech, which is somewhat interrupted by the dissentients, the town clerk calls the surveyor as a witness.

The Surveyor unrolls various plans, which he proceeds to explain to the inspector.

The Inspector: Why is the handle of the pump only 4 ft. in length? Why should it not be 4 ft. 6 in.?

The Surveyor: There is no reason except that of expense; 4 ft. was deemed to be sufficient after mature consideration by myself and the committee.

The Inspector: Yes, that's all very well, but what about the leverage?

The Surveyor: I have worked that out, and the leverage is quite correct. The length of handle is proportioned between the length of the spindle, the depth of the bucket, the weight of the knob at the end of the handle and the population using the pump.

The Inspector: But what about the rainfall of the district? Where are your returns for the past 500 years?

The Surveyor (producing a huge bundle of papers): Here they are, sir, and I have carefully calculated that the average of the rainfall for the past 500 years, divided by the area of the roofs and multiplied by the constant arrived at by the length of the rain-water pipes divided by the resistance of the bell pulls in pounds, gives a result of $x = 2.1706321$.

The Inspector: Have you made allowance for the wind pressure acting on the holding-down bolts of the base of the pump?

The Surveyor: Yes, I have, and also the extent of the lateral pressure on the soil, which is a light, friable gravel, and of the weight of the persons watching the operator engaged in pumping.

The Inspector: Have you made the necessary allowance for the extra pressure thus involved if members of the council should happen to be present on such an occasion.

The Surveyor: I have, sir, and have also made an allowance for the "gas" which may be given off in consequence.

The Inspector: Now, with regard to the estimates. I see there is an item of 3d. for supervision. How is this divided?

The Surveyor: The item is divided as follows—2d. for the clerk of works and 1d. for myself.

The Inspector: The 1d. must come off. The board will not allow money to be borrowed for any gratuity to a salaried officer of the corporation. I see another amount of £13 10s. for a memorial stone. What does this mean?

The Surveyor: This item is for the usual memorial stone on which the names of the Mayor and corporation are to be engraved.

The Inspector: This item must be struck off also, as the board will not allow it. I observe a large item for aluminium pipes with vulcanite joints. Why would not lead or galvanised iron have done?

The Surveyor: This is required by the medical officer of health,
who is of opinion that water is acted upon deleteriously by any other material.

THE INSPECTOR, after going through various other items, calls upon Mr. Bouncer for his opposition.

MR. BOUNCER: Mr. Inspector, sir, I object in toto to these proposals. We shall all be landed in bankruptcy. Already the rates of this town, sir, are 3s. 6d. in the £1, and this proposal will add at least another ½d. We don’t want this pump. There was an excellent pump close to the churchyard where we could all get water till the inspector of nuisances closed it, because he said the water was unwholesome. Why, sir, our fathers and grandfathers have drunk that water for years and were strong, healthy men, or we should not be here now. I don’t believe in all these modern fads and fancies. What was good enough for them is good enough for us. [&c., &c., at some length.]

When Mr. Bouncer finishes, an excited Ratepayer rises and shouts: I says ditto to every word of Mr. Bouncer. It’s disgraceful the way this ‘ere council robs the poor man. They thinks of nothing except eatin’ and drinkin’ and guzzlin’ at us poor ratepayers’ expense, and I says, let’s have no more of it, let’s turn ’em out, I says, and——

THE INSPECTOR (hurriedly): I declare the inquiry closed.

He shuts his note-book and rises.

[Exeunt omnes.]

I have given a large number of lectures on sanitary and other subjects, and as a rule thoroughly enjoyed them, as it is a pleasure and even a stimulant to feel that one’s audience is appreciative. I can, however, remember one occasion when this was not the case, but I struggled manfully to the end, and the following is the history of this sad occasion:

I was asked to give a lecture on “Cremation” to the medical students of the Liverpool University one night. I did not feel very well, and to make matters worse, I had to pass through the dissecting room on my way to the lecture hall, and this dimly-lit “chamber of horrors” still further depressed me. In consequence I felt all the time I was lecturing that I was not holding my audience, until just at the finish I had a happy inspiration, when I said, “So far as I am concerned gentleman, I personally do not care a scrap whether my body is buried or burned, indeed, if it is of any use to you I make you a present of it for dissecting purposes.” This raised a mighty cheer and I felt that my reputation was saved!

It is proverbial that the number of meetings of institutions, associations, societies, and congresses in England is prodigious, and at these meetings, men of all professions regularly assemble for the purpose of discussing papers, or lectures, on all sorts of subjects. Some of these societies may be called “self-advertising shows,” by
the captious critics, but as the majority of these scientific institutions carry out a propaganda of useful and valuable work, such criticisms are unfounded. It must also not be forgotten that a professional man has to keep himself in touch with all that is going on, and there is no better education, or one that more enlarges the mind, than attendance at these meetings and listening to the various views put forward, and to the discussions which follow.

Life is a variety museum full of the most engaging and interesting objects, but alas! our powers of observation are limited and we see but an infinitesimal part of that which is daily presented to our vision. We can only dimly discern the great truths which these objects would unfold if we had sufficient perception to understand them. The progress of science and consequent civilization in the last hundred years has been phenomenal and appears to have advanced more in that time than it did during the whole previous history of the world. I feel privileged to have been allowed to occupy a tiny corner of our planet during part of this fascinating epoch.

It would be impossible for me to enumerate the manifold changes that I have myself seen in my life of threescore years and fifteen, but I will try to recollect a few of them.

I can remember travelling in third-class railway carriages which were little better than present-day cattle trucks except that they were provided with wooden seats. Now we travel in luxurious corridor trains. The omnibus of my youth was a ramshackle vehicle with straw on the floor, and was furnished with a door and an iron ladder at the back, by which one scrambled on to the roof which was provided with a most uncomfortable seat called "The Knife Board." The streets of London and other large cities were paved with ordinary water-bound macadam, or rough granite sets where the traffic was heavy. Regent Street was only macadam constantly under repair and costing five shillings per annum per square yard in maintenance, until the authorities at last woke up to the fact that this was an expensive luxury, and substituted wood blocks.

I can remember the old-fashioned lucifer and the introduction of the safety match and the excitement which such a scientific discovery produced. Our clothes were laboriously sewn by hand before the introduction of the sewing machine, and our joints, and other meats, were roasted on spits in front of the kitchen fire, as cooking by gas in an oven was not even contemplated at the time of which I am writing. We used colza oil for our table lamps, which had to be "wound up" every hour or so, until the introduction of
paraffin or "Brighton Spirit" as it was then called. I can, of course, remember the introduction of electric lighting by arc lamps, and the subsequent evolution of the incandescent lamp—what an innovation after so many years of lighting our rooms with candles, oil lamps, or feeble bats-wing burner gas jets! Well can I remember the excitement that was caused by the successful laying of the first submarine cable, and I also had the good fortune of inspecting The Great Eastern, that wonderful steamship that was constructed "before her time." As I have already stated elsewhere, I can remember when the West End of London was without any restaurants as we know them to-day, but now there are hundreds of these gastronomic temples. The only hotel of real importance in my young days was Long's Hotel in Bond Street, only recently pulled down, and I can remember the building of the two first large hotels, the Langham and the Grand. Now there are numberless huge caravansaries and even more in process of erection. The telephone is a convenience of more modern date, but we have got so accustomed to its advantages that we wonder how anyone could have got on comfortably without it. There are no words that could describe the effects of the discovery of wireless telegraphy or the miracles of radium and the Röntgen rays. The inventions of the gramophone, the cinematograph, and the pianola, are doubtful additions to our comfort, but the introduction of the taxicab in place of the dirty old four-wheeled cab, or "growler," and the fast running motor-bus, in place of the omnibus I have described, was naturally hailed with delight. But the innovation that I am most grateful to have been allowed to see before "passing over," is that of the aeroplane. It is impossible to realise how this must contract the size of the world, or the change it may eventually produce in our habits. From the day that men began to think, it has been their ambition to master the air, and at last this miracle has been accomplished. Of all the great changes and advances that have been made during my life, I look upon this as the most wonderful and far-reaching in its results upon the world.

I could enlarge at great length on the stupendous change in warfare brought about by the late terrible war, but this is too recent an event for a book of reminiscences; suffice it to say that one may well speculate upon the possibility so long ago foreshadowed by Bulwer Lytton in The Coming Race, as to whether war will not cease altogether, owing to the ease with which we shall be able, some day, to kill each other. In my early volunteer days I shot with a muzzle-loader Enfield rifle, and that is only fifty-six years ago—and what changes in weapons of warfare have occurred since
then. Science has no finality; machine guns, tanks, high explosive shells, accurate long range, deadly gases, submarines, and the murderous power of the bomb-dropping flying machine, will no doubt all be improved and developed—notwithstanding the Peace League—to an extent of which we have no conception. Let us hope that this progress will be the same in more peaceful directions.

Speculations as to the future are as fascinating as memories of the past. We laugh sometimes at the so-called barbarism and ignorance of the people who lived a hundred years ago, forgetting that a hundred years hence we shall, in turn, be laughed at for our present feeble efforts.

"We are children still, wayward and wistful,
With one hand we grasp the familiar things
We call our own, whilst with the other,
Resolute of will, we grope in the dark
For that the day will bring."
