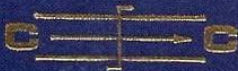


OLIVER HEAVISIDE.  
THE MAN  

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G. F. C. SEARLE



C.A.M. PUBLISHING



OLIVER HEAVISIDE, THE MAN

by G.F.C. Searle

Edited by Ivor Catt

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The late G.F.C. Searle, F.R.S., who was the friend of Oliver Heaviside for 33 years, wrote this, the only lengthy Heaviside biography, in 1950.

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## PREFACE

Wyncote, 170 Hills Road, Cambridge.  
6 Feb. 1950.

Dear Mr. Holding,

.....

I have accumulated a lot of material, say 50,000 words on "O.H. the man". Anyone who writes about him as he was will have no material but what is queer. "Impish" is the term to describe him. He was much amused at himself and I believe wanted others to share the amusement. I do not believe that anyone could out of his own imagination concoct the queer things he did. This long account of mine will be too long for publication in the Centenary publication put out by the Inst. E.E. Some of those who have been working on O.H. agreed with me when I suggested that the long account would be better published as a book than kept as a typed document at the Inst. E.E., which was the first idea. I am supposed to make a short account - 5000 words or so - for the Centenary, which could be done fairly easily from my long account. Those working on O.H. suggested a Publishing firm as a possibility and their representative was here today and has taken a big batch of my MS. to see what they think of it. There seems to be some sort of aversion to having O.H. described as he actually was. It seems to be thought that all that is wanted is for people to be told what is in his books. Actually they can get his books and can read them and understand them, if they can. I feel sure that many would be glad to know something of the man himself. If they don't understand the Operational Calculus they might find some entertainment in learning why O.H. went about for a month in the head dress of the Tuaregs of the Sahara.

I met O.H. first in 1892. I stayed with him in 1897 and 1899. In Jan 1925, a month before he died, I told the two doctors who were with him to take him to a Nursing Home. He had kept them at bay all day and wanted to see me. Mrs. Searle and I must have seen him over 100 times. Oliver Lodge saw him once in 1889 (I think) and Dr. Crowther, late Prof. of Physics, Reading, saw him once for  $\frac{1}{2}$  hour in 1914. He is as far as I know the only living English Physicist who ever saw him. I am over 85. If I do not do a good account of O.H. there is no one left to do it.

Your kindly thoughts for me embolden me to ask a question. Supposing that the Publishing Firm will not do the book at all or will not do it unless it is much cut down and much of the human side cut out, would Standard Telephone & Cables like

to do something with it? I think I have seen a copy of your El. Comm. but I cannot recall anything about size etc. It might be possible to let it run as a serial, in parts, and at end collect the parts into a volume.

I have spent practically all my time since August on this work and naturally should be sorry if nothing came of it. Some quite erroneous things were said about O.H. and these I have tried to correct. One American writer in an obituary of O.H. said "The English people hung him on the high gibbet of poverty."

.....

Yours sincerely, G.F.C. Searle.

#### Editor's Preface.

This volume is worth reading for three reasons. Firstly, it is about one of the great eccentrics, and secondly it is about one of our greatest scientists. It is the only published biography of Oliver Heaviside.

The third reason for reading it is limited to students of science and the sociology of science. The behaviour of the Scientific Establishment when faced by the brilliance of Heaviside was intensely political and destructive. It is important for scientists to be made aware of the irresponsible behaviour of leaders of learned establishments when faced by a threat to their position in the form of scientific breakthroughs. A century later, I myself met with exactly the same kind of behaviour from leaders of the I.A.E., the Inst. Phys., the Professors of Electrical Engineering and so on when in my turn I produced major advances in electromagnetic theory. Like Heaviside's, my work was suppressed - in my case for more than ten years. Fortunately the suppression has now ended, and I publish again in the top journals and conferences. Ten years is a long time however, and I fully understand why Heaviside was permanently starved, as I am often said to have been.

The judgement of history is frivolous. Oliver Heaviside almost disappeared from the record for the last fifty years. During that period he is unreferenced in any text book on electromagnetic theory, although his contribution to the subject is as important as anyone's. I myself researched the subject for twelve years without coming across his work. I was meanwhile in the process of re-discovering things known by Heaviside a century before, when one day a non-scientist led me to his.

Searle, Heaviside's friend, was worried about the lack of recognition meted out to Heaviside. Around 1950 he wrote a biography to help to right the wrong being done to him by history. This remained unpublished until the manuscript was recently discovered by me in romantic circumstances.

For recent background on the continuing problem of suppression in science, I recommend my articles in Electronics and Wireless World, Dec 67 and Jan 68.



## OLIVER HEAVISIDE, THE MAN.

### INTRODUCTION

In the following sketch I have attempted to give a pen picture of Oliver Heaviside as Mrs. Searle and I knew him. I have hardly touched on the scientific side, although I had many rather close contacts with him in some of his work; some of these contacts may be seen in my published papers. I understand that a set of such "contact" papers will be preserved at the Institution of Electrical Engineers in connexion with the Heaviside collection of papers. Professor Willis Jackson refers to some of the inter-action between Oliver and me in his appreciation of Oliver's published work. Any account I could have given of Oliver's mathematical and electro-magnetic work would have touched only a small part of the amazing totality of his output. It seemed best, therefore, to abandon any serious attempt in that direction, and to confine myself mainly to a description of the man Oliver Heaviside, as I saw him. We always spoke of him, in an affectionate way, as "Oliver", or sometimes "O.H.", and that habit has persisted in this sketch.

The account I offer deals more with incidents than with a connected history. To record where he lived at various times, when Miss Way left Homefield and his final illness and death would be an easy task, once the data were collected. What has not been so easy is to describe his ways, his outlook on life and his contacts with others. Little would have been gained if I had been able to weave all the incidents and all his outbursts of opinion into a "history", and I have not attempted it. The incidents which occurred in my own experience or in that of others may be counted as "history".

A good deal of other matter has been derived from letters written by Oliver. Of the many letters he wrote to me in a friendship of thirty three years, only a few were on electro-magnetic or on mathematical subjects. Some were encouraging, others pointed out where I had made mistakes or was dull of understanding. Most of his letters to me dealt with "domestic" affairs and were often very intimate. A good deal has been taken from these "domestic" letters, - some would contain as many as three thousand words. In my selection, I have used some discretion.

Heaviside wrote many letters to others. By the kindness of Mrs. Lorna Langley-Kramer, a daughter of the late Sir Oliver Lodge, I have been able to make some use of the pile

of letters Sir Oliver received from Heaviside. (Now at the library of University College, London. -Ed.) Most of the letters were occupied with electrical matters and intimate or domestic affairs found little place. To make any use of the "electrical" letters to Lodge, it would be necessary to compare them with the opposite letters from Lodge to Oliver, some of which are in the possession of the I.E.E. The study might be profitable. I have not attempted to deal with these "electrical" letters, since a study of them would be outside the limits imposed on my memoir.

Professor V. Bjerknes, of Oslo, has allowed me to use several letters which Oliver sent him. The later ones deal largely with home affairs at 'Homefield'.

The record I offer is necessarily a disjointed one, but I console myself with the thought that although the pictures in a gallery are in separate frames and do not form a single panorama, yet each may be of some interest.

Mary Sharp in 1790 worked on a needlework sampler, now in the Fitzwilliam Museum, Cambridge, the following lines:-

This gift, my friend,  
To thee I send,  
In hope to be approved.  
I have done my best  
I do protest,  
For one so well beloved.

Her words seem to express the spirit in which I have tried to write of my friend Oliver Heaviside.



## MY FIRST MEETING WITH HEAVISIDE

I naturally begin with the first occasion on which I met him. I had read Oliver's paper on "The Electro-Magnetic Effects due to the Motion of Electrification through a Dielectric" in the Philosophical Magazine, April, 1889 (Electrical Papers Vol.2, p504) and had come to the conclusion that some of his work was wrong. I wrote to him on 19 August 1892 and told him what I thought. He replied that he was in error, and thanked me for the opportunity of making the correction (see Electrical Papers, p514). This led to correspondence and on 28 August 1892 I wrote and said I hoped to ride my bicycle from Cambridge to Plymouth for Devonport. I might perhaps pass through Paignton and should hope to have an opportunity of seeing him. (My approach was rather timid than bold). He replied that he would be glad to see me. The weather broke up, and I went on from Winchester to Devonport by train. A few days later I went from Devonport to Paignton via Torquay and made enquiries of people in the street as to where the distinguished Oliver Heaviside lived, but nobody knew. The only address I had was simply "Paignton". At last a man suggested that I might try "Reynold's Music Stores". I did so, and saw "Charles Heaviside" in small letters beneath "Reynold's Music Stores". I went into the shop, saw a young man and asked him if Mr. Oliver Heaviside was at home. In answer to my enquiry, he said, "Mr. Oliver Heaviside lives at Newcastle". I told him what had happened that day, and he said he would make enquiries. He brought a man down from the house above the shop, who said he was Charles Heaviside. He said his brother never went out except on his bicycle. This had gone to be mended and so Oliver would be sure to be at home at Paignton. I returned to Paignton by steamer and this time took the precaution of going to the house door. "Was Mr. Oliver Heaviside at home?" "Yes". I went in and saw him there with his father and his mother and had tea with them. When I told him about the young man in the shop, he said "He is my nephew, but he has no brains at all".

Neither Frederick nor Charles T. Heaviside, sons of Charles Heaviside, was serving in either shop. They were too young. They were sometimes in the shops and Oliver may have thought that they were acting as regular apprentices. There is a sufficient similarity of sound between "Oliver" and "A.W." to lead an apprentice to suppose I wanted Arthur W. Heaviside. "A.W." often came into the shops and would be known by an apprentice, but of Oliver an apprentice would know very little.

Charles T. Heaviside was clever. He drew many diagrams for Oliver's papers. He died 3 June 1939.

I went to Paignton again in September 1893 and in September 1894. On one of these occasions we cycled to Berry Pomeroy Castle, five miles from Paignton. We took food with us for a picnic lunch and eat it while we sat on the top of the castle. Oliver opened a tin of sardines and, after his manner, cut his finger and left it to me to bandage it. As we walked about the castle, I wondered what a room on the ground floor had been. It could not have been a dungeon as there were no places in the stonework of the windows for any bars. Oliver had the solution. "I know what it was. It is very damp. It must have been the servants' bedroom".

The number of persons interested in Oliver Heaviside's work, who saw him in the flesh, is now (1950) very small. The rest must be content to gather what they can from the descriptions given by others and by me, and from the excellent portrait in the Institution of Electrical Engineers, painted by Francis Hodge. This portrait was made from a photograph of Oliver taken when he was perhaps forty. Mrs. Searle and I provided the artist with as full a description of his colouring - of course in later years - as we could, and the artist brought the nearly finished portrait to Cambridge for our criticism. When I first knew him his hair was thick and sandy brown in colour; his face and his hands had the colour generally seen with persons with hair like Oliver's. He had a beard in 1892 and kept it till he died. The portrait shows very vividly his piercing eyes. He was of middle height and rather broad of shoulder. His head was a little smaller than would be usual in a man of his build. He used to cut his own hair and beard. Perhaps he cut it when he was expecting us to visit him. At any rate we never saw him with really overgrown hair or beard. He did not go bald and in January 1925 his hair was still thick. Charles Heaviside and his son Charles Thomas Heaviside also cut their own hair.

Oliver was somewhat deaf in 1893. For the last few years of his life his hearing was very poor. He had had much trouble with his ears. The drum of one ear had at one time been ruptured, but it had healed.

Oliver never spoke of taking alcohol himself; I believe he was a lifelong teetotaler. He had strong opinions on the subject. "I read with some surprise yesterday (29 Jan. 1913) that the men in the Navy are served with a pint of grog a day (rum). That is brutal. No wonder they behave so badly on shore. They should not have any at all, for they are well fed, well clothed, picked men, doing healthy work in the purest air. The

pint of grog a day is a direct manufacture of the drink habit. It should, with a view to ultimate abolition, be at once reduced to half a pint. Five years experience would show that the men were better on the half pint than on the one pint. Then reduce it to one gill, and try again."

He smoked a good deal but was not a slave to the habit. It was always a pipe. I never saw a cigar or cigarette. I think that as a young man he was physically very strong, but he had no interest as far as I know in any kind of athletic pursuit. At forty he was an active cyclist, going considerable distances in spite of the Devonshire hills. In one letter he told me how many brake spoons he had worn out in descending the hills. In those days cycles were controlled by a spoon brake on the front wheel. At times he did a little gardening work, but I should judge that his knowledge of horticulture was far inferior to his knowledge of electro-magnetic theory.

His brother, Charles Heaviside, and his family were, I believe, Unitarians, and on one occasion I met their minister at Charles Heaviside's house in Torwood Street, Torquay. Oliver would perhaps have described himself as "nothing". He loved making fun of dignitaries and would often tell me of the various bishops who stayed in Torquay. He got this information from the newspapers' visitors lists. The dual sees of Bath and Wells and of Sodor and Man, led him to invent the See of Sodom and Gomorrah. He never showed any bitterness against religion or against persons trying to live Christian lives. He certainly was never blasphemous or obscene. Where the picture came from I do not know, but in his study at Homefield, Torquay, over the mantelpiece, was a good painting representing Jesus as a boy in the Temple. "They found him in the temple, sitting in the midst of the doctors, both hearing them and asking them questions". (St. Luke 11, 46.)

Oliver's mother Rachel Elizabeth Heaviside (née West), born 17 December 1818, died at Paignton on 31 October 1894. His father Thomas Heaviside, born 6 October 1813, died at Paignton on 16 November 1896. In 1913 he wrote, "I have nursed my parents night and day, half asleep all the time."

After his father's death, Oliver continued, for a few months, to live at Paignton. On 25 January 1897, he wrote "I am now quite alone, excepting the woman who is now my servant, and I no longer allow her to do as she likes, and neglect her work, but have reformed her considerably. If you are down this way, I can accomodate you with a bedroom. If I should have moved, as I intend doing, the people here will let you know where I have gone."

In 1897, Oliver moved to a house "Bradley View", Newton



Abbot, eight miles from Paignton and six miles from Torquay. He hired it from the owners, Messrs. A.S. Rendell and F. Symons, from 24 June, 1897, at thirty five pounds per annum. His tenancy ended on 24 June, 1909. The house was then sold, and, for a time was a children's home under the Urban District Council. The house is on the outskirts of Newton Abbot and is near Bradley Woods and not far from Bradley Manor, in part a fifteenth century mansion. He took the Paignton housekeeper with him. She left in February 1899. By letters from Heaviside to Oliver Lodge it seems that she had a stroke before 2 February and had left, probably incapable of further work, before 18 February 1899.

I stayed with Oliver at "Bradley View" in the Septembers of 1897 and 1899. In 1897, he still had his housekeeper. We went for some cycle rides. He had an ordinary safety bicycle, with no free-wheel and with only a spoon brake on the front tyre. He would put his feet on the foot rests on the front forks, fold his arms, and let the bicycle rip down steep and rough Devon lanes. He left me far behind down those hills.

One day in September 1899, I rode, by myself, to Torquay to consult his brother Charles, at 27 Torwood Street, about Oliver's complaint that men driving carts past his house, and other passers-by made very abusive remarks concerning him. His brother was confident that Oliver, who was then somewhat deaf, was under a delusion in that matter. He said that Oliver never came to Torwood Street and that they would be very glad if he did come. I said that, if I could, I would bring him. Next morning when he said, "What shall we do today?" I said "Let's cycle to Babbacombe" - a suburb of Torquay. When we were nearly there I said "We had better see about getting something to eat." He replied "I'll tell you what we will do. We will go to see my brother; he will give us some lunch." So we went to Torwood Street and had lunch there.

On my 1899 visit, we were out on a cycle ride to, I think, the little Haldon moor. He said "What is that 'lemma' in your work?" "There is no 'lemma'", I said. (A 'lemma' is a theorem which is proved as a preliminary to, and not in the middle of, a connected piece of analysis.) After some cross-questioning, we found that he thought that the Greek letter 'lambda' ( $\lambda$ ) was called 'lemma'. In a paper "On the steady motion of an electrified ellipsoid" (Phil. Mag. Oct. 1897) I found the energy of an electrified ellipsoid of revolution moving along its axis of symmetry. (The value of a sphere had been stated in 1896, without proof, in Proc. Roy. Soc. Vol 59). The method involved a parameter  $\lambda$ . For an ellipsoid of axes  $a, b, c$ ,

moving along the  $a$  - axis these surfaces are

$$\frac{x^2}{a^2 + \alpha\lambda} + \frac{y^2}{b^2 + \lambda} + \frac{z^2}{c^2 + \lambda} = 1,$$

where  $\alpha = 1 - u^2/v^2$ , and  $u/v$  is the ratio of the velocity of the ellipsoid to that of light. When  $\alpha = 1$ , the surfaces are true confocals.

In "The Electrician", 29 November 1891, Oliver, by using an electro-magnetic wave method of great simplicity and power, free from any taint of confocals, verified my value for the energy. He writes "I have much pleasure in arriving at his results because I could not understand his . It seemed academical, not electrical. He said it was not lemma, but lambda. That might be, but was unconvincing."

In 1982, my sisters and I stayed with friends in Hanover. I went, for one night, to Gottingen, where I met Max Abraham and other mathematicians and physicists. They had read, with care, Oliver's articles in "The Electrician", but what they could not fathom was the meaning of "He said it was not lemma, but lambda".

On my second visit to "Bradley View", I was under his care, as he was without help. The first morning, when I came down from my bedroom, he said "I hope you did not drink the water in the bottle upstairs." I said "No, why?" He replied "It has been in that room since the last person slept there, three months ago." Who that visitor was I do not know.

Professor G.F. Fitzgerald, in a letter of 13 September 1899, wrote "If you have not already seen him, please remember me to him most sincerely and remind him of my visit to him about this time last year, which I enjoyed so much. I am sorry I have not been able to go over to Dover (sic) this year on account of an old enemy of his, indigestion, which my visit to him (about 17 September 1898), and his exciting riding in Devonshire lanes last year helped to banish then."

Fitzgerald met Oliver twice. In a letter to Sir Joseph Larmor, quoted in his obituary notice of Oliver, published in Nature, 7 March 1901, and given on page xxiv of "The Scientific Writings of the late George Francis Fitzgerald" (edited by Larmor), Oliver wrote:- "I only saw him twice knowingly, once for two hours, and then again for six hours, after a long interval." Fitzgerald died in 1901, on 22 February, according to Oliver Lodge, on 21 February, according to Larmor. It is certain that the "two hours" meeting was prior to 1898 "by a long interval"; it may have been earlier than 10 February 1890, the date of the Royal Society Certificate, which bears



Fitzgerald's signature. Oliver, with his father and mother, left London for Paignton in the autumn of 1889. Hence the earlier meeting was probably in London.

In a letter from Oliver Heaviside to Oliver Lodge dated 19 January 1901, he wrote from Newton Abbot,

"I am grieved to hear of the illness of our friend of brilliant ideas. I will take care not to worry him. I had only a short correspondence with him last year. I hope it is not by intention that you say he "may" get all right again. Is there any doubt about it? If it is a cerebro-gastric disturbance due to over-much brainwork of an exciting and exhausting kind, it is only a matter of rest, and change of occupation; but your remarks suggest something much more serious, which I hope is not the case."

Another letter from O.H. to Oliver Lodge on 27 February 1901 said,

"I was somewhat warned by an ominous looking letter from you some time ago, not knowing previously that he had anything the matter with him; nevertheless a post card from (Professor J.) Perry, "Fitzgerald is dead", came as a great shock, and I am not easily shocked. I understand and sympathise with your grief, for knowing him so much better than myself. I only saw him twice but we had a lot of correspondence at one time, and I got to love the man. There was a considerable mutual understanding, to say nothing of his kindness to me.

He once told me he was a poor man. Of course everything proper will be done for his family, if they need help. Do you know what the disease was? Tumour, cancer?

The premature death of a man of brilliant genius and wide sympathies is a national misfortune, though, of course, the "nation" won't know anything about that."

Fitzgerald stayed with O.H. at Newton Abbot in 1898. When the first meeting was I do not know. Oliver Heaviside dedicated volume three of his Electromagnetic Theory in these words:-

In memory of  
GEORGE FRANCIS FITZGERALD, F.R.S.

"We needs must love the highest when we know him."

He was anxious to get into contact with Mrs Fitzgerald. In a letter of 17 November 1912 to me he writes:-

"Ye igitur, I got Mrs. F's address in this roundabout way. 1. Asked you. 2. Referred to Joly. 3. Wrote Joly.

4. No reply. 5. Received acknowledgement of my book from Lodge, 6 weeks after sending. Glad to see dedication. Asked Lodge for address. 7. He asked Joly. 8. Reply from Joly: "Sir O. Lodge instructs me you desire Mrs. F's address. Here it is." 9. Thanked him, adding that I asked him direct. (I didn't apologise for having troubled him. Perhaps I ought. Big man Joly, I should say. But his dead brother was all right.)"

Oliver apparently wrote to Mrs. Fitzgerald. He says

"Got receipt from Mrs. F instantly. Regular woman's letter. Pride; and joy; not forgotten; loss hard to bear; etc. Well; very glad to have given her the pride and joy; but I won't recommend her to study the work carefully to find more consolation. She might go out of her mind in the process."

On 13 December 1949, my wife and I went to Newton Abbot to see "Bradley View". The house is not far from the Market Place, on the right hand side of the road leading to Totnes, a little distance beyond some alms houses. After the alms houses the road rises rather steeply, bending to the left. "Bradley View" is on the bend. The hill gives it a commanding position, as the ground on the right falls steeply to a meadow used as a playing field. The river Lemon, a tributary of the Teign, runs through the grounds of Bradley Manor which border on the meadow. The Manor lies between the road to Totnes and that to Bickington and Ashburton. As seen from "Bradley View" the ground behind the Manor House rises steeply and on the slope is an extensive wood - Bradley Wood.

We went first to Bradley Manor, where Mrs. Diana Woolner showed us over the ancient house and chapel and gave us tea. She has often been to Cambridge and knew of one at least of my father's books, - an Anglo-Saxon 'Onomasticon'. We then went to "Bradley View" and Mrs. Parkinson showed us the house. She and her husband are both graduates of Cambridge University. The house has been put into very good modern condition. But we recognised the little glazed porch and the sitting room where Oliver used to sit in front of his gas fire.

In a letter from Newton Abbot, Oliver told me how he got on with his cooking. I have not got the date; it was probably after the departure of his housekeeper.

"I made some jam the other day out of some apples the boys had not stolen and some blackberries which I could not eat. But I am not fit for a cook, I forget. Then it

all goes to cinders, to be discovered hours later. Or if I boil an egg I am startled by a loud report; either I did not put any water in or else it has all boiled away."

A fuller account of his cooking and housework is given in letters dated 18 February and 30 October, 1899, to Oliver Lodge. Preceding these was a letter of 2 February 1899.

"Middle aged Virgin had a stroke! Pretty piece of work. But she is getting over it nicely, and I think will be fit for work again. Doing easy work today, in fact. Caused by the cold; she was wretchedly clad (unclad, I should say); plenty of wages, but she has to partially support a sister. I have of course clothed her properly." This refers to his housekeeper whom he brought from Paignton. She was at Newton Abbot in 1897 but had left before September 1899.

"Poor woman sent away. No good for hard work again, I fear. Then had a charwoman two days. She left off coming, since when I have been alone. Quite independent, and have whatever I like for dinner. Stone broth, ditchwater soup. Made several discoveries. Parsnips cook easily. Carrots don't. So if you boil them together, the same time, when the parsnips are done, the carrots are hard as stones; and when the carrots are done, the parsnips have lost all the fine flavour of proper parsnips. You mustn't pour anything hot into a glass dish. Catastrophe. Bang goes sixpence! If a pound of beef is used to make soup, and is kept boiling day after day, how long will it take to disappear? Haven't found out yet. Big lump left. Eggs and bacon diet cannot be tolerated more than one day at a time. Potatoes is by far the best and most useful diet if limited to one sort of vegetable, and are perfectly easily cooked to flouriness. Add butter, of course, presuming no gravy or meat fat. Better than bread, I am sure, is potatoes, for a staple diet. The 2<sup>d</sup> egg for breakfast is very unsatisfying; too nitrogenous and albuminous; a 2<sup>d</sup> rasher of bacon is much better. But then it is so easy to cook the egg; the bacon is a bother, as the fire has to be made nice. Never fry bacon; always toast it. Be sure the wood is dry; it is troublesome to light fires with wet wood. All pots should be cleaned out immediately, when hot; don't wait till the stuff left in gets hard. Use hot water in washing up. Never use the kitchen range if you want to boil a kettle. Most extravagant of coal and of time. Just put the kettle on an open fire. Never fill the kettle if you want 2 cups of



tea. A kipper is most rapidly cooked over the top; but it dries it up; therefore toast it in front if you can."  
(Newton Abbot, 18 February 1899.)

"Domestic. Carrots and parsnips. I have had some carrots and am going to have some parsnips this week. Much difficulty to get a suitable person in a place like this; had two; one too young, wanted a missus; other too old, couldn't stand the house cleaning work. So I have gradually got used to doing it all myself, and have given up looking or enquiring about working housekeepers. It isn't so very bad; a nuisance certainly; but there are compensations; no row going on in the kitchen, unless I go and make it myself; a great saving of money, much needed now I am out of work; balance put on the proper side. I have adopted the Principle of Least Action. It is a most clumsy machine in electromagnetics, but is splendid in the house; assisted by the older principle that Prevention is better than Cure. E.g., nasty job blacking boots. Don't black 'em; use tan boots. Fires is a most horrid nuisance, with the dirt and the work. Abolish them; use gas fires; no more trouble and labour. I have four, a gas cooker in the kitchen and gas fires in sitting room and bedroom. It is such a blessing, that I am always thinking how to get gas or something to do the rest of the housework. Cooking dinners is a nuisance, so don't have any dinners, that is, of the usual style. Breakfast, tea, and supper are easily managed; I get my coffee, bacon and egg all ready in 15 minutes at the most; tea and supper, 5 minutes is enough; then dinner is simplified by having just potatoes, and perhaps another vegetable, with milk, or cocoa, cake, jam etc. The worst of all is the house cleaning. That is a serious matter, but thank God it doesn't want doing every day." (Newton Abbot, 30 October 1899.) The gas fires appear to have been installed after the housekeeper had left.

I did not see him again until Christmas 1905. I had then been married for 1½ years and we were on our first visit to Torquay. I wrote and told him that we were going to Torquay; he replied he would be pleased to see us. We went to Newton Abbot and Mrs. Searle took him some flowers. We had tea with him. We had been warned as to what we should find. The teapot spout was completely stopped up by tea leaves and no tea could come out of it. Oliver tipped the pot so far that the tea ran out of the top. He caught what he could in the cups,

and carefully spooned the tea leaves out of Mrs. Searle's cup. We went to "Bradley View" nearly every other day for perhaps three weeks. Before our next visit to Torquay I wrote and asked him if we should visit him. He said he would be glad to see us. On the back of the envelope he put "No flowers by request". We went many times to Torquay in either the winter or the spring; on each visit we went several times to "Bradley View", as long as he was there.

He would sit in an arm-chair near the gas fire with his feet on another chair. He had a dressing gown over his ordinary clothes and covered his legs with an eiderdown. He had a constant longing for warmth. To us from the colder climate of Cambridge his house was often oppressively hot. After some conversation he would say "Now I must go and get the tea ready" and you would hear him cleaning the knives, and then throwing them down. His habit was to throw things rather than to put them down quietly. Then he would ring a little bell and we went in to tea. He said one day "There are nine pieces of bread and butter - three pieces each. There is some cake at the end but I don't recommend it."

The last time we saw him at "Bradley View" was at Christmas 1906. He was quite yellow with jaundice and in a very shaky condition. He had been sitting upstairs watching to see whether boys would break any more windows. Boys used to tease him a lot and write on his gate.



## SOME ASPECTS OF OLIVER'S PERSONALITY

From the account of Oliver's life at Newton Abbot, the reader will have learnt something of his personality. Except for his love of birds, he appears as a rather grim figure. But there were lighter and brighter sides to his character and I must give some glimpses of them before passing on to the next stage of his history, viz. his life at "Homefield", Torquay.

Oliver enjoyed music and had a keen appreciation of good music. This is in line with his loathing of anything he classed as "second rate". I never heard from him that he had ever been a pianist. But Rollo Appleyard in his account of Oliver in his "Pioneers of Electrical Communication" (Macmillan & Co., London 1930) quotes (p220) from one of Oliver's letters (undated) to an unnamed friend,

"In the old days I went to concerts, very long and highly classical; I always got wearied. I could not take it in - except the divine Schubert. Now there are a lot of very fine overtures of the Freischütz type. People hear them again and again, and so get to know them. May their performance be never discontinued. .... I am very deaf.... I have no technical knowledge (of music) nor am I a pianist, though I once taught myself B's (Beethoven) Opus 90. I liked it better than anything else. Truly the conflict between the intellect and the heart."

Appleyard continues, "In those 'old days' he also devised a musical notation intended to be easier to read than the orthodox system of lines, bars and notes. Later he found some pleasure in playing an 'Aeolian'. The instrument he used still exists."

When after his death, Oliver's goods were sold, the aeolian was bought by Messrs. Frederick and Ethel Sarah Heaviside, who then - it was after the death of Charles Heaviside - controlled the musical business in Torwood Street.

My own experience of his musical side comes from his use of the aeolian and the planola. Oliver had the aeolian at "Bradley View" in January 1905. When he went to "Homefield", he took it with him. I do not remember seeing it at "Bradley View" when I stayed there in September 1897 and September 1899. I left "Bradley View" before 16 September 1899. The aeolian may have arrived after I had left. A letter, quoted by Appleyard (p248) from G.F. Fitzgerald, dated 21 September 1899 suggests that the aeolian was a novelty at that date. "I am delighted to

hear that you have set up that aeolian. You are so fond of music, I am sure it is very good for you and will help you to do more and better work than you could ever have done without it...."

After Oliver moved to "Homefield" he got a pianola. This was attached to an ordinary piano. It had "fingers" which "played" on the keys of the piano. It was operated by wind from bellows worked by the musician's feet. Mr. W.G. Pye (died 13 October 1949) went with us two or three times to see Oliver at "Homefield". He gave me, by letter of 9 October 1949, a good description of the thing. "The pianola was an attachment fitted on the piano, with a pair of bellows which supplied air by suction through perforated (paper) rolls actuating other mechanisms to strike the notes on the keyboard. O.H. being deaf caused a terrible row when he operated so that he himself could hear. When these pianolas were operated by persons who were not pianists, they produced quite reasonable results. But when operated by skilled musicians, they produced really good results that could hardly be detected from perfect playing in the real way of human hands striking the keyboard." On 20 September 1949 Mr. Pye wrote "I remember how he used to use the pianola with great vigour, so that, notwithstanding his deafness, he could hear the music to his own satisfaction, but to the discomfort (not knowingly) of other persons in the same room."

I operated the pianola many times. The music roll had a line marked on it; turning a knob or moving an arm (I forget which) to keep a pointer on the line, the intensity of the sound could be regulated in the manner indicated by the line-to the right for loud, to the left for soft.

I believe that the pianola was given to Oliver by his brother Charles Heavyside. The piano, on which the pianola operated, belonged to Miss Way. The pianola was at "Homefield" for some years. I do not remember seeing it after Miss Way left that house.

Mr. F. Williams, who married Rachel Eliza Way Heavyside, daughter of Charles Heavyside, tells of Oliver's love of music. He writes, 10 October 1949, "My first introduction to Oliver was at Paignton, where he was living with his parents. (He and his parents moved from London to Paignton in the autumn of 1899.) My wife was looking after them at the time, and went over there from Torquay every night. Frequently I accompanied her and had supper with them. Oliver was very fond of the best music, especially Beethoven, whose piano sonatas he was never tired of hearing, and I used to struggle through

the least difficult ones for his entertainment."

Mrs. Beatrice Emma Cather, daughter of Charles Heaviside, gives us a glimpse of Oliver's bright side. On 12 October 1949 she wrote, "One thing I remember about Uncle Oliver at 'Homefield'. He always kept a tiny gas jet alight. I sometimes think it might have been that having lost his sense of smell, there would be no fear of it being turned on by mistake; or perhaps to light his pipe. He used to be very merry with my brothers and sisters and me. I remember in the big upper saloon of my father's music saloon, how with my father playing a march, he at the head of us would march around, in and out of the pianos (perhaps a dozen), we hanging onto his coat tails in a row, one behind the other. He loved classical music, and though not a musician himself, delighted to play Beethoven's sonatas with the help of a pianola player. Also a lover of pictures, and, I believe, of Dickens."

What now follows is hardly musical, but it does have to do with the reproduction of the human voice. During my visit to Oliver at "Bradley View" in 1899, I wangled it so that Oliver went with me to lunch with Charles Heaviside and his family at 27 Torwood Street. They had a phonograph. The victim spoke into a mouth-piece. A diaphragm moved a stylus which made an impression on the tin foil, coating on a revolving cylinder. When, subsequently, the cylinder was rotated, the voice was reproduced, not at all badly. Maxwell's lecture, in 1878, on The Telephone, as recorded in his Scientific Papers, does not mention a phonograph, but I have always had the impression that he showed one in action. At any rate, there is a phonograph at the Cavendish Laboratory, Cambridge.

In "The Life of James Clerk Maxwell", by Lewis Campbell and William Garnett (Macmillan & Co. London, 1882), is (page 403) a letter from Maxwell, of date 5 January 1878. "We have all been conversing on the telephone. Garnett recognised the voice of a man who called by chance. But the phonograph will preserve to posterity the voices of our best speakers and singers. See "Nature" of January 3rd." In a letter of 5 February 1878 (page 455) is "The last American invention of the past year is Edison's Talking Phonograph. This instrument has an ear of its own, into which you say your lesson, and has a mouth of its own, which at any future time is ready to repeat that lesson. The memory of this machine consists of tin foil thin enough to be impressionable by the metal style which is set in motion by the voice, and yet thick enough to be retentive of these impressions, and at a proper time to communicate a corresponding motion to the style of the talking



part of the machine."

The Heavisides ordered me to deliver an oration to the instrument. All that I could call up in my distress was a word picture of "How they cook chickens in Georgia." I had been in Georgia U.S.A. in the autumn of 1898 and had seen portions of chickens - mostly legs and wings I think - offered for sale to "railroad travellers" at the depots, or stations. There was very little flesh on the bones. The legs etc. had been fried. They tasted O.K. I hope Oliver enjoyed my essay, although he was fond of birds.

Oliver found pleasure in toying with Latin words. From perhaps some foreign address to him, he got "Te igitur, Vir Praeclare" (or Preclare). The words were probably in a setting like "Te igitur, Vir Praeclare, nos salutamus", for Te is the accusative of Tu - "We, therefore, salute thee, eminent man" - in many letters he addressed me as "Te igitur, Vir Preclare", sometimes, "Vir Preclare", or, for short, "V.P." He often ended with "Vale" - "farewell". As a variant on 11 January 1913, he wrote "Georgio Searlio et spouso. Salutem. Te igitur." He would invent Latin, as when, in the mood of appreciation of Miss Way's kindness, he wrote of her as "Mulier Bestissima" - "the very best woman".

On 27 June, 1914, when repaying ten pounds of a loan, he wrote :- "DrS. Te igitur, V.P. Ego te remittere £10 (decem pundi Anglorum) in returno honorum. Vos recipe obligato". His letter of 2 November 1912, ended with "Vale, Oliverius Heavisidius".

In a letter of 22 July 1913, he had a warm feeling for me, and wrote "O Dr. Searle, Vir Preclare. Thou art of more value than many sparrows". This is only one indication that he knew passages in the Bible.

He found some fungi like large oyster shells growing out of some decaying wood. He called the fungus "Oystershellum heavisidensis (Torquay)". In 1908 he concocted a long account of a flowering plant "Grandiflora Crystalpalliensis (Paxton)". There was a Crystal Palace in those days, and Sir Joseph Paxton was a landscape gardener.

Sometimes he would distort words, e.g. "Pax Vomicum" for "Pax Vobiscum" - Peace be with you. Playing with Greek letters, he wrote "Te igitur, Vir Preclare, cum tu me et . Vale. F.A.C. PRI." - "Come to me and eat-a bit'o pie. Farewell. F.A.C. PRI." The FAC.PRI is from his Gottingen Diploma, which declared that, among the propagators of Maxwell's theory, he was "Facile Princeps" - "easily foremost".

Oliver was employed for a few years,\* as a young man, by the \*1866 to 1874

Danish-Norwegian-English Telegraph Company which operated a cable from Newcastle-on-Tyne to Fredericia, Denmark. Many years ago, I gained the impression that he had actually worked in Denmark, and that he left Denmark because all the other English operators had left. My impression is confirmed by the knowledge of Danish shown in a letter to me. The Danish used is rather old-fashioned according to present-day style.

In the autumn of 1912, we stayed in an hotel on the hills above Trondhjem, Norway, about 2,000 feet above sea level. It would have been ideal, if the duck-pond had not overflowed into the drinking water reservoir, with ill effects to me. We moved down to an hotel in Trondhjem, and there I soon recovered. He wrote to us while we were still in Norway.

"Yours 1 Sep. received 7 Sep. 1912. Hvorledes har de det nu? Jeg tænken du ei skulde drikket daarlig Vandet. (How are you now? I think you must have been drinking bad water.) It attacks the intestines, and you evidently suffer from bad assimilation. Boiled milk is fine. I like it with lots of sugar, and coffee added to give it a grown-up taste. The mere warmth is fine. The sugar (lots) is important as food. Cake chocolate ditto. I am very sorry your northern trip has (aperiently so) done you so little good." He ends "Go'mot'n. Forvel." - "Good-day and farewell."



## THE MOVE TO HOMEFIELD

Our next news of Oliver was by a letter of 15 July 1908, from "Homefield, Lower Warberry (Road), Torquay. My continued illness has obliged me to move, to enable me to go through next winter. And to have varied diet, and comforts of a home, etc. Garden my work just now. Clipping bushes and sawing up wood etc. 1½ acre. Lots of trees, bushes, and flowers. Now at most luxurious stage."

Oliver gave no further description of the place where he was staying beyond "Homefield, Lower Warberry, Torquay." When we went to Torquay for Christmas, 1908, we found that he was in the house of Miss Mary Eliza Jones Way, sister to the wife of Charles Heaviside. Miss Way had consented to receive him as a "paying guest". He had, on 10 June, 1908, given notice to his landlords that he wished to terminate his tenancy of "Bradley View" at the earliest possible date, 24 June, 1909. He asked them to arrange to let the house and to collect the rent. He said he was leaving for Torquay in a few days or weeks, and he did leave on some date before 15 July 1908. The rent for the last three quarters, ending 24 June 1909, appears to have been paid by A.W. Heaviside, then living at Ealing.

Mary Way's action called for great courage. She had, for many years, known of the ways of "Ollie". One incident may serve as an indication of his disposition. Mary Way and her sister, Sarah Susannah Jones (nee Way), wife of Charles Heaviside, went to Newton to tea with Oliver. In case he was short of provisions, they took him a loaf of bread. He resented this kindly act. He would not use the loaf, and kept it on the table for about a year, till Charles went to Newton. Then, stung with disgust at finding the loaf still on the table, Charles hurled it out of the window.

"Homefield" was built on the south side of a hill. The drive from Lower Warberry Road down to the front door was steep. Just beyond that door, some steps, and, I think, also a steep path, led through some trees and shrubs, by a descent of say ten feet into the garden proper, which was walled. One could enter the house by the front door, go down one flight of stairs to the kitchen and other offices, and walk out, on the level, into the garden. The garden was long; at the lower end was a door opening onto a lane leading to the steep Stichill Road. The front door had a porch with a small seat on one side. The door opened into the hall. Then, on the left, there was the drawing room and on the right the dining room. One of the

other rooms on this floor served Miss Way as her bedroom during her later years at "Homefield". A staircase led to the first floor to Oliver's study and bedroom and to one or two other rooms and "offices".

While Miss Way was at Homefield, we could obtain admittance by ringing the door-bell. After she had left Homefield, Oliver needed something more sonorous. He kept a stone in the porch; instructed visitors applied it with vigour to the doorknob. This was generally effective.

After the departure of Miss Way, the entrance became gradually more picturesque. Before very long the outside of the door was covered with many and varied documents; among them were summonses for non-payment of rates, notices from the Gas Company that payment was in arrear, a portrait of Mr. A. J. Balfour, an advertisement for "Twink" (a dye) and many other items. The notices of summonses and of arrears were posted on the door by Oliver himself. He wished, I think, to show (a) to himself, (b) to visitors, how those claiming payment persecuted the Worm and also the Worm's contempt for them.

In a letter of 10 December, 1908, to Oliver J. Lodge, our hero gives the following fuller account of "Homefield".

"Left Newton Abbott this summer on account of impossibility of going through another winter there in my very broken state. 'Beware the hot and cold disease', said the Sage. It is the devil, and will pursue you to your death. I should have left even the first year I was there, finding the people to be so savage (not all of them), except for the impossibility of finding a house to suit my purse and other things. I remember I rejoiced to find that house at all, it seemed the only one in a large area, after a long hunt. However the amenities turned out to be shocking and unrestrained. At last, however, I have no house; I am only a lodger; I have lost my independence; like Mr. Pecksniff's pupils. If I want anything more, I am at liberty to mention it! And such an odd landlady, who has to be 'mentioned' to over and over again, and finally gets waxy before she does it. Yet she is a very good woman for all that; much too kind-hearted and free in her kindness. When she has money, lends it to flatterers who don't pay it back. But she is very poor now, having lost so much money by lending it, and by bad speculations. She is the owner of the property, but it is mortgaged, as well as other property, so her net income is quite small. Hers and mine (most of it) together carry on things in a cheese-paring way. No servant, no gardener, not even a charwoman.

Lots of disagreeables. But I dont have to get up and go down to drive away intruders, at the risk of a fresh chill, or a stone in the eye; and I dont have my panes broken and splashed over my sick bed, as at Newton Abbot. And the garden furnishes me with endless work. Never catch up because an hour or two per day is enough for me. I am much stronger than I was, and eat better, and have put on some flesh, but I cant get rid of 'the hot and cold disease' and its disastrous effects on the liver and stomach. I dont expect to, but only to reduce the violence by raising the stamina. Then there is the insomnia due to the internal derangements, which follow Ague and Fever. 2 hours per night frequent; if I get 4 hours sleep made up in bits, I think it good. That 2 hours is ruinous to the working brain power. I am getting better sleep now, on the average.

The property (  $\frac{9}{10}$  acre, small house) is between two big places, one  $2\frac{1}{2}$  acres, deserted, unlet, where the Dean of Durham and Mr. H. Gladstone have lived; the other ( 4 acres) a very big house, at present let furnished to a Capt. Mac Somebody and Mrs. ditto, friends and servants. This big house is too near, especially the menial quarters, sometimes a nuisance. But the tenants keep the menials in order, on the whole. I see I am getting gossipy; I have caught it from my landlady, who is full up with nothing else, except food, being very stout. I fear she is liable to be turned out, by 'calling in' of Mortgage (I think that is the expression). Then I suppose I must move again, and for the worse. A colonial bishop used to live opposite, so you see I am in quite a good neighbourhood, and we are intruders in a sense. There is no peacock on the lawn, and a good job too, the row that conceited bird makes is awful. But there are plenty of trees around, and I delight in them. But this sort of gossip can go on for ever, so I wont waste your time on more."



### LIFE AT HOMEFIELD WITH MISS WAY

The story of Oliver for those years, after July 1908, when Miss Way was still at Homefield, cannot be understood without some account of her. Of her father, Oliver wrote, on 22 Feb. 1912,

"Her father, old man Way, was very clever. Would go out before breakfast, paint a picture in two hours, frame it and glaze it in his own workshop, exhibit it in the window and sell it for £10 to £20. He, in one good year, sold £1800 worth of his own pictures. Industrious man. Didn't do much in the shop himself, left that to sons and daughters. Gave lessons in drawing and painting. Fine connection. No education. Rose from the people. Universally liked; princes, princesses, grand dukes and dutchesses (sic), all sent for Mr. Way, and all went to his shop to buy."

According to Oliver, Tuesday, 13 Feb., 1912, was her birthday. "Estimates [of her age] vary from 69 to 71." In his letters he generally called her "The Baby".

When we first met her at "Homefield" in 1909, she was, by Oliver's estimate, from 66 to 68. She was of middle height and stout and had a beautiful complexion. She became increasingly gouty. The photograph of her taken by me represents her very well.

When Oliver arrived at "Homefield", Mary Way soon felt the impact of his passion for eradicating "neglect of duty" from any who served him in any capacity. He told her, "You must write to your friends and tell them not to come to see you". She said, "Why?" He replied, "Because you have got to do the work." In many ways he was very oppressive to her and very inconsiderate. I think he did not realise the unkindness of it all. Some, out of many, incidents may be given as specimens.

Sometimes Miss Way would go out, perhaps without telling him, and not come back quite as soon as he expected. Then she might find him in the garden with a lighted candle looking for her dead body.

At Christmas time, 1914, we wanted to take Miss Way to a concert. But the difficulty was that she had then no shoes in which she could walk with comfort. Oliver would not let her go the two miles to Paignton for the help of a chiropodist. She was too stout to operate on her own feet. To relieve her, I spent a morning and an evening in practising chiropody.

A day or two later, we took her, by cab, to a bookshop, bought her a pair of soft cloth-topped boots, and then went on to the concert and tea afterwards at the Pier Pavilion. We had a very happy time. Oliver was very cross with me for paying for the shoes. He compelled me to tell him the cost, viz 12/3, and sent me the amount by cheque dated 5 Jan., 1915. But he could not compel me to cash the cheque, which I still have.

The account which Oliver gave me of how badly Mary Way treated him over pease pudding is a mild specimen of his complaints against her. Here it is.

Tuesday, 30 January 1912. "The great Lentil Question cropped up today (not the first time). Shall I when I want Pork and Pease pudding hot, this being the proper time for that wholesome and vulgar fare, to make the system able to resist the cold, shall I be diddled into eating lentils instead on the plea that they are much nicer, and so nutritious? Never! I had enough of it before. I was introduced to lentils at Paignton, by a niece who took charge when my mother became too feeble; it was substituted for my mother's pease pudding, most unwarrantably and without any consideration for our feelings or wishes, but merely because this new cook was a vegetarian, and vegetarians seem to have a spite against pease and always preach lentils. Why, I hardly know, probably because they have been proved by chemical analysis to contain a little more nitrogen than pease. This learned girl (a woman now) had nuts for breakfast, because they were recommended by some idiotic vegetarian journal, and contained more nitrogen than anything else. Save me from nitrogen! It's a mad world. I preferred the pease, but never had 'em again. It was always that sloppy lentil soup.

"But why does the Baby do it? She isn't a vegetarian, eating nuts for breakfast, with vegetarian butter (a fraud), and vegetarian cheese (another fraud) at other meals, all very nutritious and nitrogenous, no doubt. Because she once was strongly under the vegetarian niece's influence, and so imbibed a lot of her nonsense, and it hasn't gone off yet. I have, however, got rid of cabbage stalk soup, and some other wretched frauds. She eats real good cheese now Cheddar and St. Ivel, and all sorts of non-vegetarian food. (Perhaps too much).

"Having asked for the seasonable dish (a change from chopped up steak and potatoes - half black), I got the pork because there was some in the house, rather stale, and not the right sort, but wouldn't have the lentils or their nutritiousness. (Several times same thing before).

She wasn't amenable to my very civil remonstrance that I knew lentils very well; I wanted pease. 'Oh! You know everything!' she replied, with some temper. 'I assure you they are very nutritious.' 'But they are not pease pudding. Don't you know what pease pudding is? Pease pudding isn't made with lentils!' She is going to buy some, if procurable. To keep her from forgetting I drop down a note periodically. No.1 (new series) informed her that the Jews ate lentils in the Bible, but there is no mention of pease pudding. No.2 (in preparation) there was a plague of lentils in Egypt in the time of Moses. Also there was one case of living for forty days on lentils and wild honey, or else honey and wild lentils, they were so nutritious. No.3 (ready tomorrow) mentioned in Magna Charta. Felony to rob the villein of his pease pudding. No.4 (soon) Act of George IV. Fine 40/- or one month on grocers and others for substituting lentils for pease pudding. And so on. I shall get my pease pudding in time, as I did my Brawn. That's another story.

"In summer of 1909, I came to the climax of my liver-stomach trouble. Seven weeks in bed, or else 9, living on milk, taken through a tube, sugared. I got a new stomach in the end, very tender. (Strong fever, pain indescribable) (Born again). I was reduced to nearly a skeleton in appearance, with my ribs like this. Jelly came next. And chocolate. 1 egg. But I wanted feeding up and couldn't take either bread or meat or vegetables. Instinct told me Brawn (pig's head, or cheek, rather) was the thing. Tried to get the Baby to get it; again and again; she seemed to think it was only a fad of mine; got it at last, home-made; ate a slice once per 2 hours, along with a drink of coffee-milk or milk, day and night for a long time. Instinct was right. Laid on flesh rapidly, and when the winter came I was quite stout. But it was poor quality. I hardened it afterwards by garden work, and a gradual return to stronger food; meat (steak) last of all. Lost all taste for fish, for tea, for vegetables (save potatoes) only care for rump steak, with pork for a change. Bread disagrees. Paste is not to be thought of. Obliged to eat biscuits, but don't find them very agreeable. The effect of the addition of real meat (with the juice in it, not outside, turned to Bovril) is wonderful, as a stimulator in the assimilation of other food. Don't talk to me about Nute, and Nitrogen. (The rheumatism, and arthritis, was only a sequel to the severe illness. It took 1½ years to go off, just a trace now)." 27



31 January, 1912. "Pork. Awful at night. Not indigestion, I think. Perhaps ptomaines. Violent convulsions, body and brain, like a gymnotus in a passion. Right today. Perhaps it was due to the absence of the Pease Pudding. (Bulletin no. .... Lentils are High-Church. Always eaten in Lent by the stricter sort, as a penance, accompanied in private by hair-shirts and beads)."

We paid many visits to Homefield. Until Miss Way left, Mrs. Searle generally consorted with her, and was rewarded by many lively articles from the "Homefield Proceedings". I would be with Oliver in his study. We sometimes talked some electro-magnetic stuff, but more often we spoke of people in whom we were interested. We all met at tea in the dining room.

Miss Mary Way showed Mrs. Searle a long "agreement" which Oliver got her to sign; here are some items:-

"M.W. agrees never to marry a nigger. - O.H. agrees never to marry a nigger. - M.W. agrees to wear warm woollen underclothing and keep herself warm in winter. - M.W. agrees never to go out without O.H.'s permission. - M.W. agrees never to give anything away without O.H.'s permission."

On one occasion Oliver caught us in the drive before we reached the house. He handed Mrs. Searle a note which she was to read before entering the house. It was to the effect that it would be better if she encouraged Miss Way to do her work and did not take her out to concerts.

At one time, Oliver's very inconsiderate treatment of Miss Way, as revealed by many of his letters, seemed to call for rebuke. One day I seated myself on a table in his study near the door with my feet on a chair so placed that he could not open the door. I told him, without any "soft soap", what I thought of his treatment of Miss Way, to whose kindness he was very much indebted. I tried to make him realise that he was a tyrant. One lesson in "manners" satisfied him, and it was a year or more before he asked me into his study again. He felt safer behind the skirts of Miss Way and Mrs. Searle.

Oliver had collected a great many portraits of people, some from newspapers, some steel engravings, some actual photographs, etc. They were displayed on one wall of his study, and on the back of the door. On 13 Nov., 1912, "Stuck up about 300 pictures in my rooms. All sorts, steel engravings, wood engravings, oil and water colours, chalk, photos, chromos, processes. The best are the small steels, put in the panels [of the door] which make a good framing. Got lots of woodcuts, perhaps a thousand, but they are either very coarse, and wont

do, or else they are on india paper, and wont do. I hope the charwoman wont wipe her dirty fingers on my work."

Many of the portraits were those of scientific men. His collection of them showed his interest in a world of science much wider than his own official field of mathematics and electro-magnetic theory. He knew a good deal about people, more than one would expect a man to know, who had lived so long by himself. He was more in correspondence with other people than it was fashionable to suppose.

Among the mural decorations of his study at "Homefield", Oliver displayed a copy of the Diploma from the University of Göttingen, of date 1905, conferring upon him the degree of Honorary Doctor of Philosophy and Master of Arts. Besides the official document, several copies printed on good ordinary paper were sent to him, and one of these served as the "poster". He gave me one copy; it measures by inches. To deflate the pompous Latin of the Diploma, he amended *Wilhelmi* (genetive of *Wilhelmus*, German Emperor) to "*Wilhelmibus*", and decorated many other words, on similar lines, according to taste. We do not remember even hearing of the Diploma at "Bradley View", and we are sure we did not see a copy before we saw it at "Homefield". If Oliver showed us the official document, I have forgotten it.

On one of our winter visits we went to tea at "Homefield" with Miss Way and Oliver. He said to Mrs. Searle, "I do not think you tie your tie properly; if I get you a tie, will you wear it?" She replied "That all depends upon the tie." Our next visit was for tea on Christmas Day; Miss Way had gone out to friends for tea. He showed us into the drawing room, and then went off, perhaps to get tea ready. We saw, laid out on the chair two "chest-protecting" ties, each with a spring grip in it for securing its narrow neck band; such ties are now obsolete. One was blue and brown, the other purple. My wife fancied the blue and brown tie. When Oliver came back to the room, he said "I think the purple one is beautiful. [He liked good strong colours]. So she, diplomatically, chose the purple tie, and he gave it to her. For our next visit, she fixed the tie neatly in place, partly by the grip of its spring on the neck band and partly by x pins. Thus adorned, she took her tea, and later Oliver said "I have been looking at that tie all the afternoon; I think it is perfectly lovely."

Mrs. Searle's sister, the late Miss Emma Edwards, was with us on one or two of our visits to Torquay while Miss Way was still at "Homefield". Oliver was quite fond of her, and in his letters would ask me how things went with her at "Muzzle 'ill" (Muswell Hill). He put her initials E.E. into square form and

wrote E<sup>2</sup>. She could recite nicely and recited to him for his benefit. She had to stand close to him, because he was deaf. One day she did a piece about two ladies choosing something in a dress shop. One would say "Don't you think so, dear," and similar expressions. Oliver would then break in with an impish "Yes, dear".

Emma was a devout woman and full of goodness. A poor woman in London, who, in the war of 1914-18, was losing a lot of weight through tubercular trouble, was completely healed in answer to Emma's prayer. The unmistakeable "atmosphere" about her did not repel but attracted him.

Another sister, the late Amy Edwards, on one visit stayed on at Torquay for a few days after we left. Miss Way thought Amy might be lonely and asked her to tea. She recited to Oliver, and reported that she had much enjoyed herself at "Homefield".



### PANGS OF LOVE OR RHEUMATISM?

A letter dated "Monday, the dark day" and posted 23 January 1912 covers a wide range. It runs:-

"After your leaving, within  $\frac{1}{2}$  minute, I was seized with a pain in the heart, which grew fast, and spread over a large area. It was accompanied by a feeling of great anxiety, and of impending calamity, and despondency, and an aching desire for I know not what. I went and played Beethoven's Funeral March, but it did no good. Then came dinner; 2 oz. of minced steak underdone was all I could eat; the potatoes might have been fine sawdust. Bad afternoon. In the evening I tried to raise my spirits by going through that picture book you left, but not the ghost of a smile did it raise. They seemed quite silly. I thought of the splendid work of du Maurier, and many others. Truly the 20th Century was worse than the 19th. Till I came near the end, and saw some pictures of a wife shaving her husband. They were poor and coarsely executed. But I laughed; why, it seemed impossible to tell. My diaphragm was agitated in a spasmodic jerky fashion, and the pain in the heart was distinctly relieved. But what was there to laugh at? I considered. Why, it was you and your wife sitting under a cocoa-nut tree in the island of Bermuda, she operating upon your ferocious moustache, and a lot of little naked nigger boys looking on grinning. [In the first part of 1911, we spent about 4 months in Jamaica and Bermuda]. But was the pain the pangs of love, or was it cardiac rheumatism? Anyway, I shall put something warm over it tonight in bed, and trust that will drive it away. I had lots of it at Newton Abbot, the town of savages, on account of the frequent failures in the gas supply, and the days of waiting before I could get it remedied. But let me forget that dreadful time, when I lived in a £35 villa, suffering from the moral, intellectual, physical, legal and pecuniary consequences of poverty. Truly I have no more money now, but the "Torquay Marriage" I and the Baby have made is equivalent to raising both her income and mine, with far greater comfort. It was forced on me at first by complete breakdown in health; I have recovered from that, slowly, except for sequels, but I fear my mental activity is gone for good. I cannot concentrate upon anything now save for a short time. Of course the constant thinking about money matters is contributing to that, and keeping the Baby up

to the mark, and out of mischief. She was a spoiled child, had everything she wanted, did as she liked and would do it again if she could. Rather a difficult subject to manage, sometimes. But it is nothing to what it was the first year. She had no notion of the duties of a housekeeper then...."

Postscript "Pangs of love still hanging about my heart, or breast, or buzzum."

## MARY WAY'S SISTER'S DEATH

"My Baby has been very troublesome this summer July 1912. Upset by her sister's illness and the uncertainty. Always going to die. This afternoon; or in three days; or at any time. Against my advice, she took to going down to see whether was dead yet, for that is what it amounted to; whether her sister would recognise her, or could speak intelligibly, etc. The more she went the worse she got, and I got paid out for it. At last I had to stop it, and refused to let her go to the funeral. That brought it to a climax, and she gave it me hot and hot. I was a tyrant; she was my prisoner; she would not stand it any longer; she was my slave; she would have a new agreement with me; she would go out just when she liked; she owed me no money at all; etc., etc. ad lib. I took most of it very meekly indeed, but sat with her and listened till she cooled down. What seemed to hurt her most was that she was under my thumb, as she said, illustrating it by pressing down her thumb on the table. Well, that is unfortunate, and yet most necessary and fortunate under the circumstances, for she is quite incapable of managing her own affairs, and would have gone to pot without me.

"She is much better now, and shows some signs of a desire to do her duty to me to some extent."

Miss Way's only sister, Sarah Susannah Jones Heaviside, wife of Charles Heaviside, died 3 July, 1912.

Oliver declared that he had been subject to much rudeness of an aggressive kind since he went to Homefield. It seems to have died down. On 28 January 1912 he said that the trouble had almost disappeared. With regard to the old troubles, he wrote:-

"It was not merely the base rudeness of savages; but also the natural rudeness of country town people, a thing that I hardly ever met in London, Newcastle, Edinburgh, Glasgow. Here is an example:-

"I am sweeping up the drive. As I come to the gate, I see a little party come along, two ladies, two children. Instantly one lady calls out loud "Look! There's Ollie again! I haven't seen him for a long time." "Gabble, gabble, gabble," as they fade away. Now can you imagine anything of that sort in a London suburb of similar kind to this part of Torquay? They looked like ladies. Or imagine people actually crossing the road to my gate, and



leaning on it, staring hard at me for two minutes, as if I was an animal at the Zoo. People who are, or pass as, gentlemen."

DR. CROWTHER

Dr. James Arnold Crowther, (died 25 March 1950), Emeritus Professor of Physics, University of Reading, and for many years my colleague at the Cavendish Laboratory sends me some notes of a visit to Oliver at "Homefield" in 1914. He writes (30 Sept. 1949):

"I only met Oliver Heaviside once, when I called on him at Torquay with an introduction from yourself. I called once or twice unsuccessfully at the house where he lived, but eventually, in response to my knock, the philosopher came to the door and admitted me to his sanctum. I seem to remember a rather thick-set, rosy person with a good deal of hair about his face, and dressed rather shabbily and untidily, even by my standard which (having been accustomed to distinguished dons) was not a very high one.

"The room I was shown into was large and very brown. There was a large table in the middle, littered with books, manuscripts, and the remains of a solitary lunch, all mixed up, and on the sofa a similar melange of books and MSS together with the remains of the breakfast crockery. I have an idea that relics of still earlier meals were somewhere in the recesses of the room, but I cannot be sure. As far as I could tell, Oliver was living in the big old-fashioned house quite alone at the time; at any rate, there was nothing to hint of any other occupant, or any sort of attendant.

"Heaviside immediately launched into a long argument on some electromagnetic topic, from which I gathered that all was not well with the commonly accepted treatment of that subject - an impression which I retain to the present day. From time to time I interjected what I hope were appropriate remarks - but in spite of your careful training, I was, and still am a little shaky on mathematical electricity. After half an hour or so, I was kindly but firmly dismissed; and I never had the courage to call again.

"I was, I may add, very deeply impressed by Oliver Heaviside, even in such a brief encounter. I never met anyone who (in spite of surface eccentricities) impressed me more deeply with the feeling that I was, momentarily in contact with a really great mind. I have always been glad I made the visit."

In a letter, Oliver said "Crowther said it was a nice garden", but Crowther has no distinct recollection of the place except of its general unkempt look.

Crowther is sure that the 'sanctum' was a large room on the ground floor. Oliver's study, every time we saw him, was on the first floor. We did not go to Torquay between Christmas 1913 and Christmas 1914, and have no clue as to why Oliver, in the spring of 1914, should have used the drawing room as a study.

A letter, 15 April, 1914, from "Inexhaustible Cavity", Torquay, expresses Oliver's disappointment when possible callers did not visit him:-

"Dr. Searle, Te ig. V.P. You have not caught on to my little note about E<sup>2</sup> Emma Edwards . Nothing to do with . . . . . Dr. Burton . He didnt bring his wife, even when invited by Miss Way and self. Or daughter-in-law. My fault, no doubt, though I can't exactly see it.

"Your friend Crowther came lately. He didn't bring his wife. That was certainly my fault, because I did not know he had one. So I left it to M.W. to invite wife, which she didn't do. (She had shown signs of vinigarity that day).

"Your friend Bromwich didn't bring his wife either, and kept away himself too. My fault again.

"Then there was a London Professor who came, and he didn't bring his wife. And I asked him to come again and bring his wife with him. Of course I ought not to have done so. I am always wrong. Well, he seemed surprised and said 'To see whom?' 'O,' I answered, 'Anybody, myself, for example!' He laughed it off, came again, and didn't bring his wife.

"It's a funny world 'All the world and his wife' (Old saying). Vale!"

Crowther did not see, or hear anything of Miss Way. No doubt the 'Vinigarity' is the explanation. It means that there had been a clash between O.H. and M.W., and that, for the time being, she had "neglected her work" and had done nothing for him. He had probably cooked his own meals and left the washing up till he felt inclined to do it.

Miss Way needed fresh spectacles, and Oliver wanted a pair either because he needed fresh spectacles or because he had none. I am not an optician, but I had in Cambridge a good set of lenses etc. for sight testing. I borrowed from Miss Troulan, Optician, Torquay, a "trial frame" and a range of lenses from which I thought I could find lenses to suit her. We were pleased to give her the spectacles, which Miss Troulan made up as a



result of my test of Miss Way's sight. On 9 January 1912, I paid Miss Troulan for the spectacles for Miss Way and for Oliver. Oliver wrote 20 January, 1912, "Miss Way finds the 'specs.' quite right and is really grateful to your wife for them." And, on 28 January, "She is very grateful for the spectacles which seem to suit her very well, and also said it is very generous. I said, that's the wrong word; if people can afford it, there's no particular merit in mere generosity. I said she should say kind, considerate, thoughtful, trouble-taking. And she agreed. Right again."

The effect of the new glasses was remarkable; no wonder that M.W. was grateful.

On 22 February 1912:-

"Baby made another discovery. When she does her hair with the new glasses on. She says it makes her look 20 years younger! She is gratified and flattified and worried, of course. And a good job too. Make her keep up a proper pride in her personal appearance as every woman should. And men too, only they won't take the trouble and the time, having only mugs as a rule which don't flattify them. Now what is the scientific explanation of the phenomenon? Could her eyes have been so bad that her visage seemed distorted, and she thought herself very ugly? Vanity, so much preached against, is a Virtue. Only, like other virtues, it becomes a vice if carried too far. Like eating a large quantity of salt, instead of a small spoonful. As for me, I would wear the most gorgeous clothes if I had them, and if it did not expose me to unpleasant attentions. That would not gratify or flattify me, so I wear the old dressing-gown instead. Until gorgeous clothes are in fashion.

"This property of the new glasses suggests a most profitable invention, (when found) viz a sort of glasses to look through or look into which would cause all wrinkles to disappear, hollows to fill up, noses to straighten, wide mouths to narrow, etc. It is not impossible."

I did my best with Oliver, a difficult subject, needing patience. He would not give the attention needed to decide whether a particular lens gave him better or worse vision. He spoke of the nuisance of wearing spectacles and of the uselessness of my lenses, with other remarks calculated to engender an inferiority complex in me. But I did not give in, and in the end I was satisfied that I had found lenses which did improve his vision to a worth-while extent. I asked Miss

Troulan to make up a pair of spectacles to my prescription.

Oliver did not appreciate his spectacles. On 12 October 1912, "Baby says 'specs' great comfort and begs me to send kind regards. As for mine, if I could turn the 'specs' into a wig, I would, for that is a great comfort too, to a bald baby, and I could wear it myself if she wouldn't."

The 'specs' had a rough time. He wrote, 11 January 1913, "Giorgio Searlio et spouse. Saludem. Te igitur. Specs. Gimcrack frame. 6/6. Glass came out. Long hunt. Found accidentally in pocket. Rivetting badly done. 6/6. Never again. The old style, much superior; only legs too short. Also cheaper."

"Would you like to have 2 'spec'-cases from an unknown donor? to sell any buy anything you like with the money."

## DRAUGHTS

Oliver's love of warmth made him hate draughts. On 27 January, 1912, he wrote the following essay on Draughts, etc:-

"My trouble has been that I can't warm the house, not till late in the evening, and the reason for that is the Baby's persistence in leaving the doors wide open, both in the basement and on the ground floor, letting strong draughts of cold air come upstairs [he lived on the first floor] and cool my rooms and me below the standard necessary to me for existence without constant indigestion and chest cold and worse, far worse, infinitely worse, if I can't restore and maintain my temperature. Of course I have given up garden work for the present. So I have been in bed several times for periods in the day-time, and with fires in two rooms, bed and sitting rooms. Ask the Baby not to leave the doors open. No good; she does it once or twice, and then leaves off! Stupidity as much as want of memory and woolgathering. She thinks it is only a fad of mine. And then my door is blown open again, and I know she has opened another door. And there are such a lot of them downstairs. Now in the evening, 8.30, her rooms are insupportable, but I have got my rooms beautifully warm, and the internal troubles are passing off. What made it so bad today (27 January, 1912) was the presence of the chargirl, not the real original charwoman, with Doan's backache or lumbago, but her daughter and she is a nice specimen. As she went about she did just the same as the Baby. When I left my bedroom in the morning, I found the front door set wide open. Had been so for more than half an hour, freezing the house! And after that, as she went about, whenever she came to a shut door, she left it wide open, one after another. Spoke to her. Temporary relief only. In the course of the day I went down 8 (eight, acht, octopus, octavo etc.) times to shut open doors. The last one was the Baby's own doing. I was sure there was a door open. It was denied. Found it in the basement. Strong draught. Yet the Baby said she had shut it! What she did was just to give the door a sort of a fling, and then the wind at once blew it open pretty wide. This inattention and carelessness and indifference are very common characteristics of Devonshire natives.

"What cast some humour on the situation, of a grim kind to an invalid, was my finding the doors of two rooms shut which I had particularly requested the Baby to keep



open, all the year round! There is no draught, and I want the warm air from the gas stove to enter them dry, or as little damp as possible. I like to have a good grumble occasionally. I would not do so if the evil were natural or essential. But it is quite easily preventable. It used to be far worse the first year I was here; if I put a lump of coal on the fire, the Baby took it off again (not always), and told me to go away to my own room. But how glad she was when I gave her one of my gas stoves to warm her bedroom, when she was suffering from a most severe chill internally, besides rheumatism, gout, eczema, swollen joints. The relief was so great, and her improvement so rapid (internal chill and consequences) that she was really grateful to me. For a time. All forgotten now. As for my being ill then, she had hardly any appreciation of it. Same with others. My ulcerated bleeding stomach, and jaundice, etc. became "a little poorly", or "a little tightness on the chest", or "HAVE You Been Out Today?" again and again. Especially the formula "That's because you this that or the other," at fancy. Or else "Ah, you don't etc., etc." Or it may be the hard stare, and then "I don't see anything the matter with him. I don't believe there is. All imagination."

But I am wandering from the mark into a region requiring volumes to describe. The great lesson of my life is that it is MONEY, and nothing else that rules the world of Common people, that is, nearly everybody."

## BURNING GLASS

Some time before 1912, people were advised, as a measure of economy, to put glass on to coal fires. The red glow of the hot glass was said to give out extra heat. As long as Miss Way was at "Homefield", there were coal fires when needed, and she followed the advice given and put glass on them. Oliver wrote me full reports of the sarcasm he lavished on her and her method. On 22 Feb. 1912 he reported "Found the origin of the burning of glass. It was not the nut-girl (see Lentils episode) but the nut-girl's children. They said there was a large glass bottle in the school stove, and they asked why, and Teacher said it was to save the coals, and they must all tell their mothers. The Baby then put a large bottle on, and found it got red hot, and gave out such a lot of heat. She has given Mrs. Brin (charwoman) a large bottle .... As for me, "You don't know anything about it, although you think yourself so clever."

In August 1912, it turned cold:-

"The continuance of cold and wet has made the Baby insupportable. Always trouble with her between autumn and winter, owing to her obstinacy, delaying putting on her winter underclothes, including rheumatic night gowns, neatly arranged in a spare room! (Perhaps she had made some small change.) And the fire. Nearly all clinkers of glass. Took the matter in hand myself today. Took out a scuttle full of glass and threw it away in the garden. Then the fire lighted at once, when I laid it, instead of taking  $\frac{1}{2}$  to 1 hour's coaxing. Then she came in and abused me violently. She would go away; she wouldn't live here; she was very ill. I knew nothing about fires; etc., etc. .... After all her abuse, I will have no more of the nonsense, but will take away the fresh bottles she says she will put on, as fast as she does it, and so tire her out. But I can't very well force her to put on her winter garments in wintry weather..... And she says it is killing her! What is? Her own folly, and assertion of her independence, and do as she like-ness."

## THE GREAT NOISE

A letter of 26 January, 1913, described this phenomenon.

"There was a sound of thunder in the night. Or something else. Quarter to four, meditating on my sins, as usual. Loud noise and bump! Below. Not Miss Way; the Baby is too soft. Something heavy and hard. House vibrated. My bed did, at least. Up at once. Also down. Miss Way's room was on ground floor, Oliver's on first floor. Room nicely warmed, suitable for rheumatically inclined obese person, who won't have a feather bed under her. Faint light burning. Baby in bed; on her back, very quiet, eyes open, looking at me. - O.H., 'Is anything the matter?' Baby (faintly), 'Nothing the matter.' O.H., 'But what was that awful row? It shook the whole house.' Baby, 'I haven't heard the slightest sound.' Etc. etc., but no corroborative evidence to be obtained. Next morning, however, Baby said she let the (hot) 'water bottle' fall out of bed. It was cold and she was removing it.

"I can imagine the scene. Baby terrified by the great noise, immediately crawled into bed again, pulled up the clothes, and with panting heart waited for the dénouement. As for 'What is the truth?', you must ask What is human nature, especially Devonian. But I am told Cornishers are the worst, and admit it. Lie systematically.

"Now look at me. When I, seized with giddiness, the room going round and round, clutched at the chest of drawers, and pulled it over, there was a remarkable row. But I didn't deny it. What on earth would be the use? I was on the floor too. That's nothing. Ain't I always on the floor, or else am getting up from it, or rising again?"

By about 1911, Oliver's mathematical power and his physical strength were waning. He could now no longer do much in the garden. Dislike of being seen by strangers deprived him of the recreation of walking in the streets. He had a very severe illness in 1913, and through it, I believe, he finally lost his mathematical power or, at least, the urge to use it. As his mathematical power failed, he needed some mental occupation, and this he found, ready to his hand, and to his taste, in a detailed study of the delinquencies and deficiencies of Miss Mary Way. He obviously found pleasure in writing letters. Perhaps he enjoyed heightening the colours in the scenes he describes, sometimes with a skill all his own.



I give now a specimen of his "Studies of Mary Way." Some specimens have already been given. Others will follow in due course. From time to time extraneous incidents slip into his "Studies", but Oliver put them there and I have not removed them.

What Oliver used in his "Studies " was his interpretation of her character. He, of course, like the rest of men, judged her as he thought he saw her. Others who knew her formed their own picture of her. Those who read the "Studies" will marvel at her patience. It may suffice if I quote from my letter of 3 April, 1913, to him when he was still ill:-

"I know that Miss Way must have felt very anxious and I should know, without you telling me, that she would do all she could in a most unselfish way. She will never be addressed as Mulier Praeclara nor will they say Te igitur to her, but her name is written in golden letters in the list of the Great Ones. At least that is my opinion, and I expect you think the same."

Her nephews and neices loved their "Aunt Polly" for her kindness and unselfishness.

Oliver wrote this study of Mary Way on September 8, 1913:-

"Another scene. Began with rebellion, and threatened to become tragedy, and ended in comedy. 'Much ado about nothing'. She Miss Way invited herself (7 Sep. 1913) to go out for a motor drive to Buckland Beacon, and of course was not refused. She made a farce this morning of consulting me about it. I took it very calmly and tried to get to know the conditions. I could have ascertained them yesterday if I had known of the proposal, but she had not even mentioned the matter to me. Her replies were not satisfactory. I advised her not to go. I knew she had only summer clothes on. Cold wind. She got waxy and then very rude. She was determined to go. She was to call at 2 p.m. at the place. (It would have been sharp work.) I had no one to send out to make enquiries. Finally she said if I wouldn't let her go, she would leave the house and never come back again. 'Will you give me the keys?'. 'No.' She then began to dress herself. (She had a hard day's work yesterday preparing for her visitors, and was looking bad. That was an additional reason for my reluctance.)

"Then came a ring. Some one called. Ten minutes later, M.W. came to me and said Mrs F.W. had called. Would I like to see her? I had a little private talk with her and explained things. She undertook to take the greatest care of her (M.W.) and to bring her back to the house. I then

told M.W. it was all right, all arranged; don't waste time, none to spare. Mrs. F.W. left. Then M.W. asked me 'Would I give her the keys?' I replied jokingly, 'But you won't want them! You are not coming back, you know!' 'So I wouldn't, if you had not let me go,' was her reply. 'Well,' I said, 'you have no time to lose. Don't keep them waiting.'

"I warned her later that it was a quarter to two. She should start at once. Reply inaudible. Went down to her at 2.10 to ask if they had promised to wait for her! Found her eating her dinner. Something fruity, apples and plums, steaming hot. 'Didn't you understand,' she said, with great deliberation, 'That it is postponed till Thursday?' 'No,' I said, 'Not a word, either from you or Mrs. F.W.' So it ended in her going on eating her juicy dinner....

"Regarding her visitors, as M.W. knows but you don't, I want them to come (with exceptions, robbers and artful 'ladies' on the look out for a soft job). I have spoken to her nieces about it, when they have neglected their aunt. But she must not make a boarding house of this place. No more of that. The bed's gone!

"Escape of gas in scullery stopped at last. Rather a bad fault. Men ought to have found it sooner.

"I received an elegant compliment from her today. 'I [O.H.] only know one thing' she said. 'I was good for nothing else.' I was so conceited as to imagine she might refer to my scientific work, of which she had heard from others several times, so I said she might give me credit for two things; I know how to prevent a rogue from robbing her. 'Yes, that is what I referred to,' she said, 'You are good for nothing else.'

"Pity me, O man of many sparrows. No credit even for taking away that blessed bed, or for getting the artful 'lady' sent away; or for saving her from being sold up, or 100 other things. Nothing else.

[Mr. Frank Way was a son of Mr. Frank Way, senior, whose widow lived at Ipplehen  $3\frac{1}{2}$  miles from Newton Abbot. The son went to South Africa early in life and there married Miss Cary of Devon. He kept a store at Port Elizabeth. He came home to see the old country and took his mother and his aunt Miss Way for motor trips in Devon.

On one occasion, Mr. F. Heaviside took his Aunt Polly, Miss Way, for a ride in a side car fixed to his motor cycle. He was severely reproved by Oliver for exposing M.W. to so much danger. The worst of it was that she thoroughly enjoyed the ride.]

"6.45 p.m. Got note from Mr. F.W. He is a tradesman (store of some sort in S. Africa) and does not understand the decencies and amenities. He asks me to tell M.W. that the day is altered to Friday, and that, further, on Wednesday his wife will take her to the Pavilion. No enquiry as to the convenience of those days! Friday is the worst day possible (charwoman, tradesmen, all sorts of things). Thursday and Monday are the best days. She wrote and told him, and asked him to call on me. Friday is an impossible day, without excessive inconvenience and upset. The silly people at T... Street think that I have nothing to do except to read the paper, and have no idea I have any work to do. (Their work is play.) It is the impossible old man at T.... Street who circulates these tales, year after year. Even since I came to Devonshire he has been under the delusion, and Mr. and Mrs. W. have of course picked it up. I have nothing else to do! You know what persistence scientific work of the mathematical kind demands before success comes, and the failures go to the W.P.B.

"Agreeable Conversation.

8.20 p.m.

- (conciliatory) O.H. Miss Way, wouldn't Thursday be the most convenient day?
- (vinegarily) M.W. It's all settled. It's to be Friday.
- (con.) O.H. You don't answer me. You know that Friday is the busy day, with a concentration of work, and the charwoman to be looked after. How can you arrange it?
- (vin.) M.W. It's to be Friday. It's all settled. The charwoman does very little in the afternoon and you will get your dinner.
- (con.) O.H. But don't you think that if you had explained things, it could have been arranged for Thursday? Friday is very very inconvenient. You know that very well.
- (more vin.) M.W. What difference does it make to you? You will have your milk.
- (less con.) O.H. It's no use explaining the difference it makes to me. You don't understand. These things are mutual arrangement and convenience.
- (very vin.) M.W. You treat me like a DOC! (Volcanic outburst.)
- (very indignant) O.H. In what way?
- (very indignant) M.W. You make me your SERVANT, to do your dirty work.



(soothingly) O.H. But it isn't much you do for me; only meals, or little more, and you undertook to do it. We all have to serve. You haven't the means to be independent, and do as you like.

(very angrily) M.W. I was a FOOL to do it. I have made myself the laughing stock of the town by making myself your servant. You are the most Selfish, Grasping person I ever met. I won't stand it any longer, I'll go away.

(Moving her fist up and down and glaring at me.)

(resignedly) O.H. Very well. Call me all the names you like, and get it over. Please to go now. I have had enough of it.

(A lot more abuse, listened to in silence. Face very red. Full of rage.)

"I strongly suspect that the ..... has been making mischief again, perhaps, to my discredit. 'Laughing stock'. It must mean something. Or is it the 'lady'? Or is it simply the imaginative mania of old age? This is certain, at any rate, that the more she goes to the Concert, the worse she gets, and it seems to be caused by the mental excitement, more than the physical. A quiet life with an occasional treat seems the best, not 'tearing about' to tea-parties and concerts. Her mind is weak, and multiplex; she can easily pass under the influence of others from + to - .

"Very bad, isn't it? And comical too. The great C[harles] D[ickens] would have delighted in portraying M.W. in her varied moods. I am getting callous. I must. I am so abased by seeing myself in M.W.'s eyes! Talk about beams. It's a timber yard. I am a monster of cruelty. I'll go away. I won't stand it. I'll go to Berry Head and turn up in Ireland to be interred by the Rector who forgot the prayer book and read his butcher's bill instead. You remember him, don't you? The man who sends begging letters, and owes a big butcher's bill which he wants you to pay for him! Refused interment in the Abbey because I had spoken disrespectfully of Bishops.....

"4.15 p.m. Mr. F.W. has taken warning by my note, for I hear from M.W. that an alteration to Thursday is proposed for the trip. But the tickets were bought last Saturday for the Wednesday Concert, so that can't be altered. It was only yesterday I heard about this engagement, and I told M.W. it would save useless talk if she were not so secretive. That set her going

again, but I soon stopped it. She is now going out again to have more talk, talk about it at T..... Street.

"I expect no improvement in her till she can settle down to duty, and realise how thankful she should be, and that can't occur while this almost daily tearing about to Concerts etc. goes on, which makes her so discontented. Mr. and Mrs. F.W. are really very well-meaning kind people, but they don't understand. If they did, they would tell M.W. not to make such a fool of herself, and consider who her best friend was, who had saved her from complete ruin, for 5 years going. This complete ruin was imminent when I came here, though it was concealed from me, not so much by M.W., who was in a perfectly muddled condition about her affairs, but by others. I have learned that when it was proposed that I should come and live here as her lodger (£100 a year) she jumped at it at once as a way of escape. It is well to look at both sides. She should do something for a lodger with his own furniture paying £100 a year, and forcing her debtors to pay up! And since then doing much more for her by paying old bills and incurring debt likewise personally. That I have advantages here to suit my ill-health and my work is not everything. She wants to do nothing for me and tells me so! Or to engage and pay for a servant. I might if I could, but unfortunately she can't govern a servant any more than a lady nurse. It would, I fear, make much trouble. So I fall back on the fact that she can do most willingly for her 'friends' more than she will do grudgingly for me, so that the over-work complaint is largely humbug and discontent.

"I try to think of 'good Mary Way' of March last, and take it very meekly when she abuses me. Things have to be balanced. Yet after all, perhaps my meekness may be a mistake, and a good sound blowing up would do her good. I hate that vulgar practice, and can't do in Rome as Rome does without hurting myself more than I can hurt others. Yet the vulgar like a row, and soon recover! Better for it .....

"8.15 p.m. Found error [in work]. Makes it O.K., and, though not a discovery, is an important confirmation of previous work. Have now got a heap of formulae, and am writing a digest in M.S. book, for use when the opportunity comes. Waiting for supper. She would be back at usual time, ¼ hour late - 25 minutes late. Must look her up; 30 minutes late, but I see a light, so she has come back again.

"8.35 p.m. Coffee at last. M.W.'s face very inflamed;

been having energetic conversations, I think, and got the worst of it. Expected explosion. But it was only this:- Mrs. Olding is ill. Can't come Friday, or for 2 or 3 weeks. I enquired what her illness was. A very interesting event is expected! (M.W. said 'baby'). 'Then I suppose you expected it too?' 'Only for 2 or 3 weeks.' All over; no row! I shall give the Charlady a nice pair of trowsers, little worn (but too small) when she comes back.

"It won't make much difference to me. I can easily do my rooms, if she is away for a month, and no one else can come. Nor need it make much difference to M.W., for she can let things wait of the very dirty kind, and just dust her rooms. But I daresay another Charlady will be found. Blessings on the baby. Give M.W. something to think about besides her pleasures and my wickedness. O, I am so wicked. I feel it. I must be the devil's own son, if not the devil himself incarnated. The irresponsible old man of T ..... Street once called on me at N.A. with a grim face, sat himself down in chair opposite me, lighted his pipe (all in silence) and then stared at me for what seemed 5 minutes. At last he blurted out 'You're a devil.' I tried to smile pleasantly. What he meant, I never knew, and never asked. I do not know that he is an authority on devils .....

(10 Sept.) "Wednesday 4.45 p.m. Pax, pax, pax. M.W. gone to the Grand Concert dressed very fine. Very good taste too, save a little too much juvenility for 70. It's when she comes back, I'm thinking of, and tomorrow, morrow, orrow, row.

(11 Sept.) "Thursday 7.45 p.m. .... Knocked myself up [by garden work]. So been reading magazines and novel all day. I like a good novel. Good sensation, well worked out. Unfortunately, most novels are rubbish, only worth skipping. Also read Sir Oliver Lodge's address [to British Association at Birmingham]. Much about what I expected. From its popular character it will undoubtedly attract a great deal of attention.....

"I have eaten a few grapes for 3 days past, right off the vine. They have an aperient effect. Is it due to the contents of the skins, or to the various poisons left on the outside of the skin by the various sorts of insects that crawl over it from time to time? In previous years I have noticed that only a minute or two after entering the greenhouse when the grapes are nearly ripe, I have been seized with the first symptoms of alcoholic poisoning! Slight headache, pains across brow, cloudy vision etc.



I have never heard of such sensitiveness in any one else. Before eating any grapes, mind. Gripes are so called from the griping effect produced by eating gripes on an empty stomach. I think it takes place by stimulative action on the liver or the gall bladder through the absorption of the poisons in the gripes into the general circulation. It only takes a few seconds in very extreme cases, a minute or two allows a very large absorption. In time poisons find their way to the very tips of the hairs on the head. I forget for how long.....

"Read up about Pericarditis and the sounds of the heart last night. Nothing about my particular phenomenon, doubling of the second pulse in a quite regular manner. Old book though. What rheumatism causes in the first place is pericarditis; after that various disorders of the heart itself....

"Fine steel nibs I find always go best on the second day. After that they deteriorate rapidly....

"Sunday 14 Sept. 1913. Supper an hour late. M.W. got company again. Always the way. Saw Mr. F.W., and explained things to him a little. He understood pretty well. Decent chap, but ignorant like the rest of them. Wanted to know what all the books were for. Didn't know what my occupation was, or that I had anything to do.....

"[Prof. H.F.] Baker's address [to British Association, Birmingham]. I don't think pure mathematics a suitable subject for Section A. I think there should be a separate section for Mathematics. And I don't like their superior tone. It is a well-known fact that Physics has created Mathematics, and you have to go back to Physics to make new work, not mechanical developments of old work. Still Baker is evidently a cultivated man.

"I never could see the interest in incommensurables as such. Mere numbers. In real fact, we have quantities absolutely continuous. The units may be of any size, and whether numerica are commensurable or incommensurable doesn't matter a jot. The continuity of quantity has nothing to do with commensurability or incommensurability.

"I appreciate the beauty of mathematical theorems occurring in Physics. I generally dislike very much the way they are 'proved', as they say. Most mathematical books are a hodge-podge of formulas, without distinct connexion to make a theory, or to exhibit it plainly, and made as repulsive and unintelligible as a legal document by attempts to be too precise and perfect."



#### OLIVER'S LIFE AT HOMEFIELD AFTER DEPARTURE OF MISS WAY

Mary Way endured the "Coalition Government" of "Homefield" for 7 or 8 years. But with increasing age and gout, her power to stand up for herself gradually abated and she sank into a state in which she sat and stared into the fire. Eventually her nieces came with a car, and, without any warning, took her away to 27 Torwood Street. She had to leave a lot of her belongings behind, to her great and lasting regret.

Mr. B.A. Behrend, in the "Electrical World", New York, 21 Feb., 1925, in an obituary notice, wrote "His old house-keeper, as he wrote the present chronicler, became 'mad' and had to be put away." That was Oliver's version of the affair. He had made great efforts to make her keep herself warm lest she should die or become unable to attend to his wants. He probably resented very strongly what was done. After Miss Way left "Homefield", we saw her at 27 Torwood Street a good many times. She was very heavy and a little feeble in body, but she had recovered her brightness and was entirely free from any mental trouble. A cheque drawn by me, on 26 March 1926, on the account of a small temporary fund of which I was "treasurer" was endorsed by her with a strong, firm hand.

After Miss Way left "Homefield", Oliver depended entirely, I believe, on gas fires. He managed to put an ordinary gas ring into the grate of a kitchen cooking range. It was the flexible tube to this ring which Oliver and I, as told later, repaired with putty, brown paper and string. The house went back to the early days of gas. In those days the pipe from the main had only to serve for a few jets of lighting. It would be inadequate for gas stoves. I suspect that the pipe was still small for its load in Oliver's time. He made endless complaints about the feebleness of the gas supply, and put the blame for it on the Gas Company - "The Gas Barbarians".

On one occasion, long after Miss Way's departure, he would "clear the pipes". He unscrewed a cap or some such fitting near the gas meter. The gas streamed out and, fearing an explosion if the house were filled with gas\*, he lit the gas and had a fine flame some feet in length. As this display was obviously dangerous, he got a wet cloth and put out the flame. He was then able to replace the cap. His "clearing" cost him burned hands and a burned face. A queer object greeted us on our first visit after this adventure. Oliver had draped a

\* W.C. Fye recalled that in 1910 both Miss Way and I told him of a gas incident which had occurred when Oliver tampered with the gas.

large bed blanket over his head, keeping it in place by a rope tied round his neck. He looked like a Tuareg of the Sahara. The blanket fell in folds round his body. The visible part of his head was hardly more than one eye which peered at us through a small chink in the drapery. Recovery took some days. I believe no permanent injury was caused.

One afternoon, in a fit of dissatisfaction, he wrote a letter on the back of a large envelope from the Royal Society. It ran thus:-

"From Oliver Heaviside, W.O.R.M., "Wormfield", Torquay, to Manager, Torquay Gas Company.

"Please send one new gas meter of strong constitution to replace the present one which is corroded both inside and outside by the rotten gas with which you are supplying me."

I saw him write the letter. We folded the envelope so as to hide the message and kept the thing in shape by stamp edging. Olive then addressed it, and I posted it. A few days later, a young man brought the new meter and connected it. Oliver gave him a shilling. The man was surprised at this, probably unexpected, kindness, and said, "You have given me this; I will give you something. I will give you some advice. You want someone to look after you." "Ha, ha," said Oliver, "I should have to go all over the house looking after the care taken."

In his later years, Oliver called himself the "Worm", and would sign his letters "Oliver Heaviside, W.O.R.M." He was much pleased when some correspondent, taking the letters to indicate some distinction, addressed the envelope to "Oliver Heaviside, Esq., W.O.R.M." He connected the four letters with the four of "W.R.N.S." (Women's Royal Naval Service) and the four of "W.A.A.C." (Women's Army Auxiliary Corps), and said "Everyone must have four letters to his name." He used "Worm", I have no doubt, to express his conviction - perhaps obsession - that the world despised him. As a bit of "Tit for Tat", he took a compensating pleasure in despising the great majority. He recalled Carlyle's dictum about the thirty millions of English people being "mostly fools".

I do not know when he first used the Worm title. I have perhaps lost some of his letters. But it must have been a few years prior to 12 Feb. 1920, when he wrote "Dear Wormship and Lady Searle." He said, "You don't know it, but I was 'The undying worm', long before you joined the Wormery." He had a small bronze statuette, which hung from the staircase by a string; when he set it swinging like a pendulum, its shadow

moved backwards and forwards on the wall. He said, "That is the undying worm."

We called at "Homefield" one morning. He came up from the kitchen and said "What do the early birds seek?" I replied "The Worm, of course," which pleased him. The next time I wrote to him, I put on the outside of the envelope "From Sir Earlie and Lady Bird." From that time, he called Mrs. Searle "Lady Bird". In one letter to her, he wrote, "Dear Lady Bird, I hope his Worship is well."

Prof. Valdemar Bjerknes saw Oliver at "Homefield" some (little?) time before 8 March, 1920. On that date Oliver wrote to him. He mentioned Prof. Oman in connexion with a question of currency, and goes on "There was a Prof. Ohm staying at a Torquay boarding house lately. Do you know him? You seemed to know everybody."

"Portraits. 'Siemens,' I said, when I saw your father's. But the likeness is quite superficial. Your photo is excellent, very exact. I should like to see what Ohm and Oman look like. A year ago I was the Duke of Ohmseldt. But I altered it to Wormfield, being much more appropriate. I must have a quite unique and exclusive title. Searle is only a Fellow of the Society of Worms, entitled to W.O.R.M. after his name. And I can tell you that it is a greater honour than F.R.S. Would you like to be enrolled? There is no fee. I forgot to say that Fellows are referred to as His Wormship, like the magistrates, and to be addressed as Your Wormship. His wife is Lady Searle W.O.R.M."

On 3 January, 1921, Oliver told Bjerknes more about worms. "Dr. Searle was here at Christmas with his wife. He is spoiled by his 'Varsity' teaching work. Lost his memory worse than I. But pretty good health. He is a Faith Healer, and doesn't believe in worms (microbes) or in me The Worm. His spiritual worms have wormified his brain very badly. Holes. He is full of bounce."

On February 12, 1923. "Searle has no faith in worms, little or big, nor in the Great Worm either, I am sorry to say..... Yours most wormfully, Oliver Heaviside, W.O.R.M."



## ILLNESSES

From about 1898 till the end, Oliver had many illnesses; he often gave me details. From his accounts, I think he may have read some medical books. Perhaps from these, but more likely from his fertile brain, he was sure he knew the cause of and the cure for any ailment he might have. Until his relatives called in two doctors, a few days before his death, he never had, as far as I know, any medical attention. When in 1913 he was very ill at "Homefield", his relatives sent in a nurse, but he would not allow her to attend to him in any way. I never heard that he took any medicine. "Respectable" people who think it dreadful, and so bad for the relatives, for a man to die without the aid of a doctor, are more horrified at the idea of no medical treatment than they are at the commonplace fact of death. Anyway, Oliver lived to the age of 75 years, for many years under conditions which would have broken down most men in a very few years. His treatment was generally stopping in bed and living on milk for some days. Perhaps he was not far wrong.

Oliver's very active mind drove him very hard. On 13 Dec. 1900, he wrote:- "You can't find out what you can stand without trying; it is a variable quantity from time to time, and every man has to find out when to leave off. I suffered severely myself from not knowing; brain injury: I am more careful now."

I would not minimise the severity of some of Oliver's illnesses. Dr. C.V. Benton saw him in September 1913 and found him hardly fit to be about. He was obviously ill when we saw him at Newton Abbot at Christmas 1907, and, of course, in January, 1925, shortly before his death. These were the only times when Mrs. Searle and I saw him obviously ill. There is no doubt about his severe illness in 1913. But in his letters he so often told of illnesses which seemed to pass off remarkably quickly, that I am left wondering whether some of them were not psychological rather than physical. For instance, 14 January, 1907. "Awful bad day. Caught internal chill. Danger of strangulation. Bed. Got over it by the evening. Fearfully and wonderfully made."

Oliver goes on:-

"It depends on the stage rheumatism is in, whether friction, or massage, or electric shock stimulation will do good. In my present state friction would cause great pain, and probably increase the swelling. You see, I got rid of an enormous quantity of rheum in May (my hot air



cure), and re-established power of digestion (digestive failure no doubt the cause). But there is still left what settled in the bones, and its coming out is slow, slow. The whole arterial and venous system of the legs has to be remade before I lose the lameness. That humbug 'that woman' [a nurse] wanted to come up and massage me. I wanted to murder her. I had acute rheumatism all over including the heart, and the tortures would have been worse than any Bulgarian atrocities. I find warmth is the best thing. It draws out the rheum, and keeps it from crystallising. It is semi-fluid. But it may be attended with pain. Cold relieves the pain. But it is a delusion. You pay for it afterwards. The body must be kept warm to keep digestion going properly. The elimination takes place, I think, by the bowel principally; so the liver must be kept going; the kidneys secondarily. But in a severe case like mine, it came out all over me; even the skin, if scraped, was gritty. I should say there was a quart on each leg, including foot. Nearly all came out by the skin, mouth, nose, ears, eyes, etc. and, no doubt, inside me. The kidneys could not do more than a small fraction of the work. I let my fire out yesterday. Paying for it today. Acute rheumatism in knees. Stoppage of the elimination, probably, from the bones. It is easy to understand the effect of heat when you consider that the rheum is only barely soluble in the blood, and easily crystallises when colder."

On 19 February, 1913, "Been very ill since 31 January. Bed most of the time. Immense swelling developed. Say 8 inches by 6, and 2 deep in the middle. Hard as wood. Much pain, and internally all wrong. Still I am not happy. Going down to-day, but it may begin again tomorrow. Don't know what it is."

A little later he was very ill. When he was well his handwriting was remarkably steady and clear. In some weeks of his illness it was very shaky. On March 10, 1913, he reported that a nurse had been engaged by his relatives. "Miss Way, No work at all. The nurse is her nurse, and all M.W. has to do is to look in upon me about 6 times a day and put the drinks in convenient reach, and then go! ..... I have nursed my parents night and day, half asleep all the time."

He was not an easy patient. Miss Way told us that the nurse declared that he would die, and Miss Way replied "He won't die; he will live to turn you out of the house."

The nurse left on 30 May, 1913. She did not get beyond peeping at him through the crack left by the nearly closed door.

On 16 July, 1913, Oliver referred, inter alia, to some earlier experiences of that year.

"Dr. Searle, O, V.P., te ig. That reminds me of 'O mihi, et Beati Martini.... My new (+) and (-) formulae are just done. They are only raw material for continuation of my Royal Society paper. [Operators in Physical Mathematics.] Of course Part 3 must be published first in full. It is time, 21 years.....

"Lord Kelvin's remarkability was his breadth. Do anything. But in any special subject he was not specially great, so far as I can judge. It depends on standards. Maxwell was a great genius, but he had not Kelvin's breadth. So Kelvin was the great man of his time, even though he was obstinately stupid about some things.....

"It is impossible for me (or rather, useless) to tell you how I get my formulae. It is done by the mathematical methods explained in Vol. 2 of my Electro-magnetic Theory, and you haven't done that. Shame. Vale!

"When I was young, my father took me to the doctor in the hope of finding out whether it was what I had for breakfast that made me so stupid."

Things looked black sometimes. On March 5, 1909, he wrote:-

"I have been very ill since I saw you, and see no prospect of getting better till a great change in the weather takes place. Internal bleeding. Stomach and adjacent parts. The loss of blood is of no importance, but it causes persistent diarrhoea, and that is. Result of ulceration, I guess, and that's the result of repeated acute inflammations. It may go off."

On 11 January, 1913, he described Six Plagues.

"Plague 5:- Bunnion bad, very. Large. Growing bigger. Soft. Painful. Walk on heel or side foot. Why not? Save wearing out sock. Bunnion, not corn; call it large swelling on ball of foot, of unknown cause, perhaps overeating, if you don't like bunnion. Wonder whether the 3<sup>d</sup> bottle [rat poison] would do it good."

On 24 January, 1913,

"Been very bad inside; ptomaine poisoning or something like. Dreadful pain all over intestinal tract, as they call it now. Had to go about doubled up like an old village gaffer. [Pen and ink sketch of Gaffer hobbling to the Pub.] That was all one day. Next day developed quincy!

Not had one since I do 'no'. Sure sign of blood poisoning. Then liver very wrong, and violent Dagers. But it is now going off, quinzey, daggers and all. That's always the way. Reabsorption and elimination. I have no doubt that if the quinzey were not allowed to form, worse effects might happen. But that does not remove the cause. I daresay the meat is kept too long. It is six days old before it is finished. Or it might be the rat having poisoned some of the things in that box room. I brought them up to air and dry them thoroughly. Consolation. Only for life..... Hunnion has subsided considerably. One disease often cures another."

On 26 January, 1913.

"Quinzey and associated neck, ear and brain symptoms going away, but liver very bad, and associated with dim and staggy eyesight."

On 11 March 1913, he was in much discomfort. He wrote,

"Te ig. Sal. Not gout, save to small extent now. It is the true rheumatism with large swellings round joints, and in feet, and hands. Can't get in or out of bed alone, so sit in chair by fire day and night. Very irksome. About 1 hour sleep in 24. Heart bad, constantly intermittent, but I think it will cure itself. Diet for rheumatism well understood. But dyspepsia interferes."

"Extraordinary variety of symptoms in past. Chalk in palms. Crystals from eyes. Tongue white, yellow, black, red. Stewed fruit nice, but makes wind. A new cauliflower for dinner is best, but can't be got, so egg instead. The violent cold wind is against recovery. Expect a slow recovery by reabsorption of rheum. Usual way."

"F.H. [enviside] too busy. M.W. has risen to her opportunities, in a degree, and does a lot of up and down stairs work."

But he was not neglected. On the inside of the envelope he wrote:-

"To G.F.C.S. Rheumatic fever etc. M.W. rubs. F.H. bandages. Joy."

On 5 April, 1913, he wrote, in a very shaky hand:-

"One day I went down into the valley of the shadow. Heart. Still bad, but no reason why should not get right. One night caught lumbago in my chair. That finished the chair (to save disturbing M.W. at night.) Not walked a



step since. Took fancy to beef tea. Couldn't get it. Nurse and M.W. didn't think it proper. Got it in two days. At once stimulates the liver. Demanded some more. Nurse Way said I should have it for supper. Insisted and got it. Wonderful effect. Real proper liver motion followed. But it has lost power since, though I have some daily.

"Most of the swellings went down by deposition of the rheum in the eye sockets (great quantity) turning to rocks in the eyelashes and under the eyelids. Inflammation.

"Now. Got rheumatism hands, arms, shoulders, thighs, legs and very bad ankles and above. That's all."

Improvement was rapid. On 8 April (Monday night and Tuesday morning, 1913, he wrote, in a much firmer hand:-

"D.S. Vir et Mulier. My hands are not so bad as script shows. It is constrained, On my back constantly. Only the rheumatism about ankles prevents my walking a little and putting an end to a most unpleasant state of things..... You should remember M.W. can go about quite briskly, so the arrangement [of engaging a nurse] seemed O.K. After first day, O gracious. Inattention, neglect, cross and impertinent answers. As if I were a malingerer, and there was no danger in my heart attacks. I was once left for 1/2 hour taking a chill, hollering, bawling, knocking with stick, with the ridiculous excuse that she didn't know but what it might be the men knocking next door."

He complains of the 'deceits' etc. of his relatives and of Miss Way. "Why had I not been consulted." "And to think of the Mulier bestissima [M.W.] of a short time ago."

"Of course I now reduce M.W.'s ministrations to a minimum, and directly I can walk, not allow M.W.'s unwilling services..... Can't be done all at once. I make a beginning for new arrangements in bedroom whereby I can help myself at night (with difficulty) and will never disturb M.W. unless it is something very urgent. I can, in a curious way, get in and out of bed myself now, just on the edge. Couldn't do that in the dangerous times. I want feeding up but it is so difficult to get suitable foods, I was right about the beef tea hot. Now comes pigs cheek brawn..... Opposed as quite unsuitable for me. When I got it (made by M.W.) found it had been salted at the shops. It was villainous. Wasted. And yet M.W. knew what I wanted was the unsalted brawn she made for me in 1910, of which I ate a slice every two hours, and replaced lost flesh rapidly. However, after a second lot, also salted,



had been made some unsalted has been ordered for tomorrow.

"I ought to have told you that the slimy rheum came out all over the head, save cheeks, and in ears and on neck and shoulders and upper part chest. It was partly mere cuticle, but when dry the pellets you could rub off were a little stony. (Urates, commonly called uric acid.) Soluble in blood and may be deposited anywhere. Since I took the beef tea hot hot hot the eyes are much better.

"Heart. Wind brings it on usually. Even milk! One night I found myself lying across the bed, with a weight on my breastbone, unable to breathe..... Ultimately found the rheumatism had attacked the breastbone and thereabouts. Had to nurse that for two days. Sleep! Half hour in 24. Sometimes none. But I find that by taking a good drink every two hours, and some 'choc' after, I can get a lot of ease, and some sleep. Ordered special cloth boots to wear soon.

"Money melting away fast. I should like £20 loan if possible (Don't talk of gifts), making £80 I.O.U.

"How is your Neuro? [Neurasthenia, from which I suffered for about 7 years.]

"I have conquered the heart trouble for the most part. M.W. was not disturbed by me at all last night, and a lot of little things I can do myself. The waiting on me is not much.

"Valley of shadow. [I had told him of an experience of my own.] I meant death by suffocation and heart failure."

On 7 May, 1913 he wrote to "Mrs. Doctor Searle, F.R.S. etc."

"I have been informed that that odd man who writes curious plays has expressed similar views to mine on funerals. So much the better for him.....

"I had to breathe rather hard to keep heart going; and the stroke of the heart became a sort of loose flap. This led to a consideration. I had overdone it. There was the cardiac to be considered, and that the principal work was in keeping up the temperature against the very adverse wintry conditions. So I let the heart beat as very softly as possible, and introduced a sort of cardiometer. Instead of drinking when I felt I wanted drink, I drank a measured quantity in six goes, and watched progress of each; was each go followed by passage of liquid into stomach or not. In this way I got information as to what was going on and followed it up. (A doctor once made me drink soda water and then listened with his stethoscope to find out its progress in my body. The naive person

supposes that when liquid is swallowed it must pass into the stomach.) I could also tell whether warmth from outside was needed. Finally, I found that arms must not be left outside coffin. They take acute rheumatism. A nice warm woollen garment permanently round arms and shoulders was the proper thing. M.W. supplied that.

"Very little sleep. Awful nightmare and heart trouble."

To Mrs. Searle on 9 May,

"M.W. told me there should be a slope to the right in the cardiac region..... Very vague. But there is something in it, for this is written on a sloping basis, and the hair behind I comb upwards in order to allow my hair to dry, or else be wet, as the case may be, because it rests on low pillow and actually constitutes my own neck. It does work somehow.

"Found out later than M.W. left a lot of soap in my hair when she washed it. On washing it myself properly the grittiness and stiffness entirely disappeared and the hair got quite soft.

"A nice little girl, named Fenwick, staying in Torquay gave me some nice flowers today, and Miss Way forthwith put them in the one place in the room where I couldn't see them..... This little Miss F. is here with her nurse. They stay at some big hotel. I expect Miss F. captured M.W. Miss F. is grandchild or some other relation of Sir A. Noble who lent me £300."

He thought that a suggestion had been made to Miss Way "that it was not right and proper for a woman of 70 to be nursing a man of 63. I told M.W. she behaved as a true woman for once and I should never forget it."

With regard to one who remarked, "You don't seem to be making any progress," Oliver wrote,

"If he had asked me, I would have told him at once 'Splendidly, curing the feet rapidly!'"

"Fact is, weather becoming warmer. I at once adopted the hot air cure (my own invention, unless anticipated). Temp. of room kept up to 80° F at least, but not above 85° for comfort, by gas fire and external warmth. Adjusted to suit my feelings. Then I lie on bed in a state of nature, save shirts (loose), with feet high. The swollen feet began to mend rapidly, and I can now walk. Crutches are good, to support weight, but very hurting. If I go very slow, I can walk about room. But fast, has to be done by nerve force. The strain on the heart becomes tremendous. Toes are turned outward, both feet, so I walk on outer

side of heels."

On 26 August, 1913, he was evidently stronger.

"I have worked at finding the second solutions of the differential equations of the first and second elliptic integrals.....

"Latest Intelligence ..... Now I get 4 hours of sleep a night as a rule, in detached pieces. But weep not for me. I am resigned, and make scientific observations on everything. This is the last. Severely bitten by two fleas. Not common fleas. They walked about, instead of jumping over the top of St. Paul's, as I was taught when a child. Or else they made very little jumps, not higher than a cottage. I think, therefore, they must have been rat-fleas, brought in by the Stitchill [next house] rats. In general no fleas here at all, of any sort. Perhaps they don't like Vinegar (Goak)."

He found it difficult to remember that he would never forget that Miss Way had behaved as a true woman.

"The poet said 'Only man is vile'. He was wrong. It's woman too! Good Mary Way has gone for good, I fear. She forgets all I have done for her, grumbles at having to do any work at all for me.... I forgot the buttons. Sometimes she puts on buttons when they are all gone, with the thinnest possible cotton, and about 4 circuits, so that they are off at first wash, if not before. That's funny."

In September, 1913, he was able to walk, but with difficulty.

"9 Sep/13, 12.30 a.m. Just back from post. First time out. Took me 30 minutes to get to pillar box at West end of Lower Warberry Road and back again instead of 10 minutes! I was astonished. It was a crawl. Yet I have gained strength greatly in body and arms by the garden work..... I am really progressing in the feet. It is the heart I think is the worst sign. The shortness of breath has largely disappeared, but the heart has not kept pace. It pains too...."

On 9 September, 4.15 p.m.,

"Only able to carry two loads [coal] today. Last night's walk took the go out of my ankles. Ankilosis! Is that what I suffer from?"

15 September.



"Pax. H.W. mended my socks at last. Waited a long time for them. On the other hand she peeled the potatoes against my request. So it's a balance..... Eyes bad. It is the strain of x, y, z, I suppose. Heart not so bad. Still rather [picture of Gaffer]. Right shoulder blade cricky. Carrying dirt, I expect. But after my 1909 illness, my shoulder blade came right out. Had to force it into place again. I was so thin. Now the ribs never get cricky or dislocated."

Dr. C.V. Burton, an admirer of Heaviside, wrote on 20 September 1913:-

"I saw Heaviside [at Homefield] at the beginning of August, and we have corresponded pretty regularly since. It seems to me rather appalling that in the fearful illnesses he has, he does entirely without medical advice. He says an ordinary doctor would be no good to him - 'would want to give me bottles' - But one reason he gave for seeing no doctor was his lack of means."

On 27 September, Burton wrote:-

"When I saw O.H. early in August, he was slowly recovering from an illness which he ascribed to urates. He was hardly fit to be up and about, and he distressed me greatly by going through the house and finally out onto the doorstep in bare feet - my own strong conviction being that his feet should be kept warm."

Dr. Burton was scientific assistant to the Earl of Berkeley at Foxcombe, Boars Hill, near Oxford, about 1915. In the war of 1914-18 he was at the Royal Aircraft Establishment, Farnborough, Hants., and was engaged on experimental work. I was at the Establishment in 1917 and 1918. Burton had an accident with the poisonous gas, phosgene, and died on 3 February, 1917. His wife died 2 or 3 weeks later. From 9 August, 1913 to 30 December, 1916 he wrote about 50 letters to Oliver.

We were at Torquay for Christmas 1913 and saw Oliver several times. We do not remember that he showed any signs of serious illness, although he was now far from being athletic.

Mr. W. Shepherd, then a Torquay rating officer, saw Oliver about his rates at least a dozen times from 1921 to the end. He never saw him ill.



A letter of 3 April 1920 may be given nearly in full.

"Dr. Searle, F.R.S. W.O.R.M.

"Dear Sir and Lady Erle Bird. I wonder that you are not at the National Physical Laboratory. It seems that the kind of work would suit you, and be less worrying those bad boys [Cambridge University Students, my friends], and good pay, and a title to follow, though none so good as W.O.R.M. I got your letter this morning.

"The new [gas] meter goes O.K. At least it is consistent in its behaviour. An up to date direct reading meter is much wanted, with a pressure gauge, but I can't get it. The weather is equinoxious, and very disagreeable to one who is confined to the house, being cold and damp, sometimes squally and rainy. It is always a bad time for me. I have sometimes been out to sweep up, etc., but it wouldn't do. Too soon. And very painful to the feet. The gas is of much better quality now, but there isn't enough of it. My hot water circulation is only a makeshift, very cheap. It is the gas fires that are so expensive. More tanks to store the hot water, and large pipes, would cost a lot of money. But my abolition of the kitchen fire, and substitution of a griller, saved me from the hospital nursing home, and doctors, and great expense; and robbery.

"I am mostly in bed, and have reduced the door-  
nuisance to a minimum. Only visitors, the postman, the policeman, and the grocer. I have taught the postman to deliver without bringing me down, (trying to 'make me hear' etc., etc.) The parcel people are bothering though, so, if possible, I have everything sent by Letter Post. I must go down to the Constable, though, because he brings Summons, Warrants, etc., and won't be satisfied to put them through the Letter opening. The grocer's man comes once a week to the kitchen for orders, and they are delivered without bringing me down. So the domestic work is reduced to almost nothing. The principal source of 'dirt' is my bedroom; the fluff from the bed-clothes. The quantity is astonishing, and it finds its way everywhere. Furs would do away with most of that. The war will come to an end in time, when the sanctified League of Nations does, and we attend to our own business, and let the savage Russians, Turks, Kurds, Arabs, etc. etc. fight their own battles in God's way, as described by the sensible Dr. Watts. I have been much benefited by lying

in bed; the armistice winter was terrible, owing to the quite arbitrary and stupid actions of our Rulers, starving us of Food and Fuel, when they had gigantic stocks stored up, and available. Why should we be starved and frozen for the sake of those bloodthirsty barbarians.

"[Dr. J.T.I.A.] Bromwich did not come, and, as I did not know where he was, I could not invite him. I am sorry not to have seen him.

"If you have any notion of coming here after Easter, be sure to write in advance, and I will clear away a lot of the fluff and make a clear passage to my den.

"I am reading up my old investigations in my books, and more especially unpublished matter in my MSS. books, to see if I can get into proper fitness for a resumption of my proper work, what I was born for. But of course I am still on strike, and it may last some time. It was, I understand, that fanatic Lord Robert Cecil, who was the first author of that fraud, the League of Nations and Covenant and articles. But what hasses the rest of them must have been even to entertain the idea of the possibility of its ever being practical in a human world. Nothing but mischief has come out of it so far.

"Her Ladyship and Sir Ernie Bird will I hope keep up their spirits in accordance with the tenets of true Wormery..... And don't walk off their legs. Life is not worth that.

Yours sincerely Oliver Heaviside, W.O.R.M."

## THE LAST YEARS

All I know of Oliver's experiences after 26 December, 1920, till 31 December, 1924, is derived from letters from him or from information given me by persons living in Torquay. None of my letters to him after June, 1919, have survived. On 29 November 1921 he wrote that I seemed busy, but had not found time to write to him about my

"mysterious goings on at Christmas 1920 with the Americans who were going to do such fine things for me, all in pig-in-a-poke style. My reply was just to ask for information, and, as revised by yourself, was perfectly courteous. And has it come to this, that they have doled out two fifties (£100)? I should not be surprised, having had experience with Americans and their ways. But this amount of £100, which my banker has informed me has been placed to my credit at your instigation, suggests suspicions of evil communications of a local character. .... [What 'local character' means I do not know.] Do be candid and let me know what the £100 means. Nothing but mischief comes out of want of candour, and disregard for the wishes of a man who has had to pay heavily for his honesty."

He ends the letter on a lighter tone. "Ladye Byrde will be pleased to hear that the garden birds are still picking at the bones of that fowl. Just in remembrance of the delicious treat they had last Christmas!"

It will presently appear that the Americans had no hand in the mystery of the £100.

In his letter of 4 December 1921, Oliver says "I asked you to be candid, and you are not so, but evasive, on the whole."

"The two fifties, or £100. I received two advices from the Bank that you had put £50 and £50 to my credit. £50 + £50 = £100. That is what the £100 meant. But you sent only £50. Then the Bank has made a mistake (Not the first). I am writing about it."

Any money sent through me to Oliver's account at his Bank went with the provision that it should not automatically go to reduce any overdraft. It was intended for his immediate use. If a cheque were made out to me, I could, by endorsing it, pay it into his account at Torquay. In this case, it would not appear in my own account as (1) a Credit and (2) a debit, with the result that I have no record of it.

There was some genuine confusion as to whether two sums of



£50 were paid to his account or only one. It seems probable that what was sent eventually saved him from being "sold up".

In September 1921 he was very near disaster. His description, in a letter of 4 December 1921, runs thus:-

"I had arranged with the Police Inspector (Warrant Officer) to pay the Gas and Poor [Rate] bills together, and costs, on 20 September. But the Poor played me a trick..... He sent Constable Brock to me on the 19th with a demand for immediate payment, or distress would at once be made. I was obliged to pay Brock. But it [cheque] was dishonoured at the Bank! It was a nasty thing to do, seeing that the amount of overdraft was under discussion. I had no notion they would do such a thing. The Inspector came here with Brock on the 22nd with the cheque stamped R.D. (return to drawer). ['R.D.' actually means 'refer' to drawer, and does not necessarily mean that there are no funds to meet the cheque.] He was very angry. It was a slur upon his character. He came in and stuck tickets upon everything (nearly) in the drawing and dining rooms. All to be taken away in van next morning and sold at auction. I offered to help him. He would not let me have any tickets though I asked for a bundle to take upstairs, and I would stick them on everything there. No. Now this sale would have been throwing things away, under the circumstances. So I thought that C. Heaviside and A.W. Heaviside might lend me £100 for the emergency. Brock, who knows me better than the Inspector, offered to take a note to C.H. I told him very briefly of the misunderstanding, and that his children and grandchildren might be the eventual sufferers. Would he, or A.W.H., or the two together, lend me £100. Brock also took this note to the Bank, and then C.H. got it.

"Reply next morning brought by a grandson, Bernard, [Bernard Williams, son of Fred Williams and Rachel Eliza Heaviside]. A mad letter, most insulting to me personally, and full of gross misstatements of fact. I gave Bernard short reply to go to the Bank, and from the Bank to C.H. Substance:- 'No reply possible to your nonsense. I pick out the only part that answers my application. Since neither you alone, nor A.W.H. alone, or the two of you together, will lend me the £100, I withdraw my application. I will find some other way.' (And I did)."

"The sale was stopped."

Oliver found that he was only £108 wrong in current account, counting up to 30 September, when he should receive money, and with all the gas and rates fully paid up to that date. The Bank Manager recommended the Head Office to renew his loan up to the end of the year.

"When the Inspector and Brock came again, I was able to show them a note from the Bank, sent by messenger authorising me to withdraw up to £108. This..... convinced the Inspector that I was really an honest man and had not been humbugging him. He shook hands on it, but I could see that he remained very sore about it.

"Now you will see how the £100 suggestion..... came about. Perfectly natural, and nothing in it. That's the worst of it. I am £50 out of pocket, extra. To pay my way into next year, I want now not £100 but £150. If I can't get it, I must mortgage the property. I must avoid that, if I possibly can. Furthermore, this Bank error would not have arisen had you advised me of the £50 remittance, as is usual with people who understand the value of money.

"It has taken me some time to tell, not by any fault of mine, but now I think I have turned the tables on you. Will you tell me the name of the gentleman who advanced the £50, and when he did it, and why. And why to you, rather than to me. Why so mysterious? I might like to thank him, and explain my position.

"This trivial matter occupies practically all your letter. For of the important matter, you just say 'The man who consulted me about a year ago has not told me what came of his project.' But what did you do? That's what I asked about. I should like to see the correspondence that passed between you and him. I well know what you told me last Christmas, and what I said too.

"I settled with the Gas Co. at the beginning of April. I wanted credit till end of September, as last year and the year before. Of course I might have got credit for the next bill till midsummer. In fact I received a very civil note (a form) a little before midsummer reminding me that I had not paid, and asking me to pay up at my earliest convenience. But they cut off the gas on 15 August. Why they cut off, as a preliminary to summoning me for the amount due, I have not got to the bottom of yet. They don't get the amount due any sooner, and they lose a customer. They fine themselves to the extent of the revenue they lose. It is a most barbarous thing to do to the consumer. I told them so. It is obvious. But I can't find why they do it. There are others besides me. It seems

to be the custom. And they won't put the gas on again! That looks like spite. I can get nothing out of the Secretary to the point. So I am burning up the remains of the filthy war coal. It is so awful, the dirt made in the room, that I have only one fire so far in the drawing room. I think I shall have in some peat blocks, or peatoid, or other smokeless fuel. But even then there will be a lot of dirty work, though I can have several fires. It is about 20° too cold in the house for me to have comfort. But I mustn't complain, being only a worm, as you know, to be crushed by barbarians and bullies.....

"I lie in bed to stand the cold as well as I can, with a perpetual cold in the head, rheumatism, gout and various disagreeabilities. I find it hard to get suitable food too. Something wrong at Lipton's. Bacon was not delivered the previous week. Wrote about it. No notice taken. Yesterday, no delivery at all. So I am out of bacon, and short of Nestles [tinned milk], and short of candies. My dinner today was one hard boiled cold egg, some soft biscuits, and some Nestle. But it is fat (real animal fat) the is needed in cold weather, rather than sugar. Ask the Greenlanders. Sugar is good as a supplement. It is too cold for me to do any housework that I can avoid, and I never wash my clothes, save the rag next the skin, by long steeping in cold water. All else is saturated with coal dust."

A letter of 13 December 1921 from Oliver solves the £100 mystery. On 15 November a cheque for £50 sent by me was placed to the credit of Oliver's account at his Bank at Torquay. The cheque was made payable to me by Sir Joseph Larmor, who wished to remain anonymous. I endorsed it and sent it to Torquay with the request that Oliver should be advised of its receipt. He was advised, but too much, for, by error, two advices were sent, one by the assistant manager and one by the manager, Mr. C.E. Rotherham. Oliver sent me, for inspection and return, a letter from the bank offering apologies, which he said were too profuse. He said "I also enclose a statement in form of an I.O.U. [to G.F.C.S.]. I believe it is strictly correct. You should keep it safely, to send it in to my Executors in case of my premature death."

He dilates further on his household affairs.

"After a period of cold weather with night frosts and much fog, a mild period followed. Coming near the end of the War coal, I wrote on the 10th. to a man in Torre



[part of Torquay] for some Peat and Peatoid. I got his reply on the 13th., asking for payment in advance! He would then give prompt delivery on the 16th. There is evidently something uncanny about Peat and Peatoid. In reply, I said I would not trouble him. He would have to 'deliver the goods' and I would pay the bill by cheque at the door.

"That being over, and time lost, I ordered  $\frac{1}{2}$  ton of Whiteway and Ball's 'Best' for quick delivery, and let me know beforehand when it would arrive. I also told him about the P. and P. man, but I would not order smokeless fuel for fear of uncanny complications. They charge 65 shillings a ton net cash. I must wait and see what will happen, Ball is one of the Barbarians.

"Bobby [Constable Brock] tells me that the [Gas] Barbarian Directors are very rich men, and don't care a rap about losing good revenue. They cut off the gas first, and then summon for payment of arrears, just to save trouble in the office. The reason seems inadequate. I have reason to believe it is to frighten people from making complaints, the Gas Co. being a great sinner. Also the Act of Parliament of 1920 imposes certain duties upon them as regards pressure and quality which I believe they do not carry out. Their Solicitor will give no information."

After I had Oliver's letter of 4 December 1921, I wrote to some friends and, with their help, I sent a total of £50-10-0 to his account at Lloyds Bank, Torquay. The Bank acknowledged the receipt of my own £10 on 23 December. Dr. R.T. Glazebrook sent me a cheque on 27 December, and thus it is clear that I sent the cheques to the Bank as they reached me. All the Bank records of that date were destroyed in the Bank's ordinary routine.

The Institution of Electrical Engineers came to his help. On 22 December 1921, Mr. R.H. Tree, Chief Clerk of the Institution wrote as follows:-

"I enclose a copy of a letter which has been dispatched to Mr. O. Heaviside today..... Your suggestion that any remittance forwarded to the bank on Mr. Heaviside's behalf should be placed to his current account has been acted upon. You will recollect that we discussed the point with the Manager of Lloyds Bank who said that any money forwarded on behalf of Mr. O. Heaviside would be placed to the credit of his ordinary current account and would not go towards any reduction of the Mortgage unless instructions were received from Mr. Heaviside himself to

that effect. The question of supplementing Mr. Heaviside's annual income will be considered at the next meeting of the Committee to be held in the New Year. Yours etc, R.H. Tree."

The letter from the President of the Institute ran:-

"My dear Sir, The Council of the Institution of Electrical Engineers have heard with much distress that the income at your disposal is insufficient in these days of high prices, and taxation, and on behalf of the Institution I have ventured to remit to your bank at Torquay a cheque for £100 to be placed to the credit of your current account.

"The Council desires me to ask that you will be so good as to interpret the action which they have taken as a slight expression of their high appreciation of the valuable services rendered by you to Electrical Science and Engineering, and to add that they leave it entirely to you to decide whether you will so accept this sum, or whether you would prefer to regard it as a personal loan. Yours etc. J.H. Highfield."

GILL

On 23 December 1920, Mr. (now Sir) Frank Gill, of Western Electric Company Ltd., wrote to me as follows:-

"You may remember some little while ago we had a correspondence on the subject of Oliver Heaviside, and I am now in receipt of some information from the States in which considerable concern is expressed on account of the poor conditions in which they now find him. As an example, I have copies of letters from Mr. B.A. Behrend of Boston, Dr. W.R. Whitney of Schenectady and Dr. Weintraub at present in Paris. In each of these, serious concern is shown and is exemplified from the following quotations.

'During the war, his condition had become so bad that he had become a permanent invalid without the means for decent warm clothing and food suited to the sick-bed.'

'It was a shock to me to learn of the poverty in which the great English physicist, Oliver Heaviside, is living.'

'My own feeling is that it would be much nicer for us to assist Mr. Heaviside now than to put flowers on an expensive tombstone later!'

"The object of this letter is to ask (1) what is Heaviside's real financial condition. (2) Would he accept financial assistance coming from some of the big Engineering Companies in the States, particularly General Electric Co., and the Western Electric Co., as an acknowledgement of the work he has done for the Electrical Engineering, and (3) what would be the best way of approaching him on the subject.

"I am sending a copy of this letter to Sir Richard Glazebrook as I am most anxious to be of any assistance I can in this matter and to move quickly."

While he was living in Cambridge - I do not remember the exact date, - I had a talk with Sir Richard Glazebrook, F.R.S., lately Director of the National Physical Laboratory, about Oliver's condition and difficulties. I know that he was anxious that Oliver should be helped, but I do not know what he may have done in the matter. From Gill's reference to him, it would appear that Gill was aware of that interest.

I knew that Oliver's finances were low, but I had no means



of knowing the exact position. I could not tell how he would take Mr. Gill's idea, and the only thing was to ask him. On the morning of the first Sunday after Christmas (Dec. 26), I went to Homefield and said that I wanted to talk seriously to him. He said "What about?" I said I had had a letter from a man. "What man?" he said. I said I did not feel authorised to give the name. I said the man thought he could get some money from Companies in America, and that he wanted to know if Oliver would be willing to accept it. "I demand the fullest particulars" he said. He was quite unwilling to consider anything of the sort. "I must make some reply," I said, and he dictated to me the rudest thing he could construct. I said I could not send that, and we agreed on something milder, and this I sent to Mr. Gill. I saw Gill a little time later in London and told him of my experiences. Nothing came of the idea. But Oliver was highly offended.

It may have been ill health, but Mr. Shepherd's experiences strengthen my feeling that it was his anger against me, which kept us at bay when we went to Torquay for Christmas, 1921. On 22 December, 1921, he wrote,

"Yours 21st. It is not possible for me to say now whether I can see Mrs. S. and you on Christmas day. Don't put yourselves out about it. But if circumstances should lead you this way at the time you mention, I shall be waiting, or else, you will find a note of excuse outside the door... I received yours of 18th, and fail to find in it any answer to my enquiries about last Christmas's affair [F. Gill's enquiry]. Evasion again..... I wish Ladye Hyrde and yourself a Happy Christmas in any case. I don't think it can be here. Yours.... Oliver Heaviside, W.O.R.M."

We went to Homefield on Christmas day, but did not gain admittance. Outside the door was a note of 25 December, together with that of the 22nd which had not been posted. The note of the 25th ran:-

"Yours 23rd..... The usual postmen don't come now, and I have not been able to catch the extra men to tell them what to do with my letters. [The regular postman would have posted any outgoing letters put out into the porch]. Will you be good enough to put the enclosed stamped letter in the post. Enclosed is also a letter for you, stamps removed.

"I am very sorry to be unable to see Ladye Hyrde and you today. But don't let that put you out. I daresay the little walk has done you good, so you may go home and stuff yourselves in the usual way with extra appetite. To

one in my situation, Christmas is the greatest curse of the year, upsetting everything long before and after. With the usual humbugging compliments of the season, Yours.... Oliver Heaviside, W.O.R.M."

Things might have turned out differently if I had told him who had written to me. I believe now that I made a mistake in not taking him into my confidence. I thought I was acting discreetly, but my discretion cost me dear, for, after December, 1920, I did not see him 'till January, 1925, shortly before his death. We did not leave Torquay 'till 9 January 1921, but he did not admit me after my 'discretion' day. As just stated, we were not admitted at Christmas 1921 or on our visit to Torquay at Christmas 1922. We did not go to Torquay for Christmas 1923. When we got there on 31 December, [1924,] he was near his death.

I have at least the consolation that he knew that I was his friend. On the day on which, in utter weakness, he was removed to the Nursing Home, there were two doctors and a constable in attendance during the day, but he kept them at bay 'till after 9 p.m. because he wanted to see me.

I did not see him again 'till very near the end. We arrived at Torquay on 31 December 1924. On 21 December he wrote me a lively and humorous letter describing his recent fall from a ladder, and showing that he was still the same old, odd and impish Oliver. We saw him on, probably, 1 January 1925. He was yellow, and a day or two earlier had written "Jaundice, so don't expect much." He asked us to get him some handkerchiefs. We took them the next day, but failed to get in. About 4 January, we learned, about 6.30 p.m., that on that morning he had been found unconscious in his house by his faithful policeman friend, Henry Brock. Two doctors were called in by his relatives, but the old man's urgent desire to see me delayed any action until I could come. About 9 p.m. one doctor drove me to "Homefield", where I found Brock and the other doctor. I then interviewed Oliver. As it would have been impossible to nurse him at "Homefield", the plan arranged earlier by his relatives was set in motion, and he was taken that evening by ambulance to the Mount Stuart Nursing Home. I went with him. After a few days he was better, and from then 'till the end of our holiday on 19 January, we had tea with him nearly every day. He soon settled down and enjoyed the attention of the nurses and the good food. Full of fun, he dubbed the little ward maid "The Marchiness". Mr Tree, Chief Clerk at the Institution of Electrical Engineers, came to Torquay, and we met him several times at tea in Oliver's room in the Home. Oliver had dyed his hair black, and, while it was

wet, he wore a tea-cosy on his head. I found the cosy, all black inside, when, with the Bank Manager, I searched "Homefield" the next day for Oliver's Faraday Medal and other valuables. The nurses washed his hair, and, with his white hair, he looked very handsome. He won the affection of the nurses and others in the Home. The initial improvement was not maintained; he succumbed to various complications on 3 February 1925. His brother Charles had died on 28 December 1924.

Many legends grew up about Oliver. I believe I do right to record the conviction that he was never a "mental" invalid. Of course he was a first rate oddity - he was Oliver. I had been his friend for 33 years.



#### RIDER

Mr A.R. Rider, of "Greta", Braddon Road West, Torquay, gave me an interview on 18 December 1949. He was an electrician with Mr. Graham, of Wellswood, Torquay, an electrical contractor. In the summer of 1921, he was putting electrical fittings into Kent's Cavern, and there he met Constable Brock, who asked him if he had a galvanometer. Brock said he wanted it for Oliver and that he (Brock) would be responsible for its return. Rider let Brock have it and Brock took Rider with him when he took it to Homefield. This was the first time Rider saw Heaviside. Oliver expected them and promptly admitted them. If Oliver knew at what time Brock or other known person would come, he would be on the alert and would quickly open the door. If the time was not known, knocking on the door produced no result. On this occasion, they were admitted to the house. Oliver asked Rider if he could get him any little pieces of electrical apparatus he might need. He asked Rider his name and address and said he would communicate with him either direct or through Brock. Rider next got a post card from Oliver asking him to bring two Leclanche Cells, and had he a rheostat of 150 ohms? Rider made the rheostat. Rider reported to Brock all that he did, and Brock would return to Rider any apparatus which Oliver no longer required. Rider went to Homefield perhaps 5 or 6 times. Oliver had the electrical things in an attic. He did not see Oliver use them, and he did not tell Rider what he was doing with them. Oliver had a "Bully" Clock. The pendulum had a permanent magnet at right angles to the stalk of the pendulum, and the ends of this magnet moved in and out of two coils. These coils were periodically connected, through the clock mechanism with a dry battery, which supplied the energy required for maintaining the motion. I can remember the clock. Rider took dry batteries for the clock to Homefield on one or two occasions, and either put them through the small opening allowed by the door chain or left them in the porch.

Rider could not afford to give apparatus and his time to Oliver without payment, and as he was not in good health, having been "gassed" in the war of 1914-1918, he left off dealings with Oliver.

Brock would pay small sums on behalf of Oliver, without expecting or receiving any repayment. But Rider feels certain that Brock had means of tapping sources of considerable financial help for Oliver. Brock would be unlikely to disclose the sources of these payments. Rider believes that Brock paid bills for Oliver without the business passing through Oliver's bank account.

# ROYAL SOCIETY

Oliver Heaviside was elected on 4 July 1891. The certificate testifying to his recommendation is dated 10 February 1890, and was read to the Society on 1 May 1890. Sir Oliver Lodge was his proposer and the Qualifications and some other particulars are in his hand-writing. All the papers mentioned are reprinted in Vols. I and II of Heaviside's "Electrical Papers". They are listed below by their places in those volumes. Thus, the second paper (from The Electrician) begins on p. 353 of Vol. I. The essential parts of the Certificate are given below:-

(Name)	Oliver Heaviside
(Title or Designation)	.....
(Profession or Trade)	None
(Usual place of Residence)	Paignton, Devon.

## Qualifications.

Learned in the Science of Electromagnetism, having applied high mathematics with power and success to the development of Maxwell's theory of electromagnetic wave propagation, and having extended our knowledge of facts and principles in several directions and into great detail. He is author of the following papers among many others:-

I, 429 and II, 39; I, 353; I, 255; I, 231 and 277; II, 504; II, 468; II, 375; II, 355; II, 168; II, 1; II, 490; II, 519; I, 47; I, 53; I, 61; I, 71; I, 95; I, 116.

The Certificate continues

"[Oliver Heaviside] being desirous of admission into the ROYAL SOCIETY OF LONDON, we, the undersigned, propose and recommend him as deserving that honour and as likely to become a useful and valuable Member. Dated this 10th day of February, 1890."

The name of Oliver Heaviside is in the handwriting of Oliver Lodge. The signatories are:-

From General Knowledge  
J.T. Bottomley  
A.W. Kücken  
A.W. Reinold  
John Perry  
J. Hopkinson  
J.A. Ewing  
G. Carey Foster  
C.V. Boys  
Shelford Bidwell

From Personal Knowledge  
Oliver J. Lodge  
William Thomson (Kelvin)  
Geo. Fras. Fitzgerald  
J.H. Poynting  
R.T. Glazebrook

I met all the signatories except J. Hopkinson and Shelford Bidwell, and some I knew well. That Lodge met Heaviside at 3 St. Augustine's Road Camden Town, London, on Sunday, 10 March 1889, is recorded in a letter from Heaviside to Lodge. I do not know of any other meeting with Lodge. Fitzgerald was at Bradley View, Newton Abbot on one day between 16 and 19 September 1898, and had a cycle ride with Oliver. In a letter to Sir Joseph Larmor [Nature, 7 March, 1901] Oliver says

"I only saw him twice knowingly, once for two hours, and then again for six hours after a 'long interval'."

Fitzgerald died in February 1901, and hence the 'two hours' must have been prior to 1898 by a 'long interval' and earlier than 10 February 1890, the date of the certificate. Heaviside, with his parents, left London in the autumn of 1889, and thus the two-hour meeting was probably in London. One letter of Fitzgerald was as early as December 1888. I believe that Lodge and Fitzgerald were the only two signatories who ever saw Heaviside.

The following candidates were elected into the Royal Society on 4 June, 1891:-

Anderson, William; Bowen, Prof. F. Orpen, D.Sc.; Conroy, Sir John, Bart., M.D.; Cunningham, Prof. D.J., M.D.; Dawson, G.M., D.Sc.; Elliott, Edwin B., M.A.; Frankland, Prof. Percy F., B.Sc.; Gilchrist, Percy C.; Halliburton, W.D., M.D.; Heaviside, Oliver; Marr, John E., M.A.; Mond, Ludwig; Shaw, W. Napier, M.A.; Thompson, Silvanus P., D.Sc.; Tizard, Captain Thomas H., R.N.

At first, Oliver was reluctant to allow Lodge to propose him as a Candidate for the Royal Society. But, in the end, Lodge persuaded him to accept the offer. Oliver's views as to candidature are expressed in the following two letters to Lodge. If, as it seems, there were other letters, they were not preserved by Lodge.

"30 January, 1889. In my draft reply to yours of the 27th I advanced 7 reasons for declining your offer! But on submission to my brother, although he has not demolished them, yet he brought some weighty reasons the other way. I will not, therefore, trouble you with them, except one.

"Is it not a fact that a Candidate for the R.S. may be down on the list for years? Nothing would be more disagreeable to me. I would not be a Candidate if there were any chance of refusal at the first. If a man is good enough, and had shown it, why should he be a suppliant, so to speak?

"If, on the other hand, you could assure me that there would be no difficulties in the way, and that immediate



election was a moral certainty, why then, I should accept your kind offer with the greatest pleasure; and, in any case, I consider it to be an honour to be proposed by you. O. Heaviside

"P.S. If you have any curiosity, merely as a matter of curiosity, to see the 6 other reasons, some of which you may think very eccentric, I will send you my draft. It is not an unmixed honour to be F.R.S. now-a-days. Look at the Council List!

"2 February, 1889. Yours 31 January. I have mislaid the seven champions [reasons] or else the document has gone to light the fire. But it is of no consequence. Four were cancelled, and the other three are summed up in

Nolo supplicari!

"I am not at all sure about the Latinity, but you know what it is adapted from. ['Nolo episcopari! I do not want to be made a bishop.]

"You may judge of the intensity of my feelings as to possible rejection by the fact that I have so good a man as you for my proposer and no less than Sir W. T. for seconder, and still I am not happy. (I had a wicked mummy, a more than brutal pappy; they kicked me, strapped me, flogged me, whacked me. Still I was not happy!)

"You must allow for personal equation. Lots of good men supplicate year after year. Why shouldn't I? Am I better than they? The honour of belonging (after rejections) to such an august and dignified body is transcended by the precious relic of self-respect that is left in me by not becoming a suppliant.

"Look at it this way too. If a man should talk to me about the ridiculous absurdity of my not taking the R.S. and its rules as I find them, or adapting myself to them, especially as there is no reason to suppose they will alter them in my favour, I should say, 'The same argument applies to all ancient institutions, ways, manners, customs, etc. etc.; and if followed universally would result in universal stagnation and eternal persistence of the unfit.

"Somebody must decline to adapt himself, and not 'prefer the old way', like the fishes St. Somebody preached to. And somebody always does. In fact, a good many somebodies do. They are foolish and eccentric, no doubt; but they prepare the way for desirable changes.

"My case is very short and plain. If a man is good enough, and has shown it in his work, he deserves to be elected without being a suppliant; and if the rules don't

allow this, they should alter the rules.

"Now if I, after putting my neck in the noose, should find it pulled tight the first go; I should be bound to squeal. In plain English, if after becoming a suppliant (or Candidate, if you like) my first supplication should be rejected, I should be bound to answer the Snub by withdrawing my supplication. Perhaps I might go in for howling at the R.S. just to ease my wounded feelings. De Morgan used to do that, I think.

"I believe it would be unpleasant to you if I were rejected. No one but myself can tell how disagreeable it would be to me.

"You express some doubts as to election first go, as you say hardly anyone is elected first go. If this is really so, would it not be better to postpone the matter until the Council has been educated up to the mark? That is an offensive way of putting it, but you won't tell the Council of it, or my chance would be gone for ever! You will probably be in communication with Sir. W. on this matter. I hope you will let him know sufficiently of the reason of my reluctance, as I should be grieved to offend him.

"My remark 'Look on the Council List' referred to one name in particular; little less than a scandal to be there.

"I do appreciate the honour of association with the President and Secretary and other eminent men; but I have really no veneration for Antiquity. I think my historic sense is imperfectly developed. Ancestor worship is not in my creed. I think our ancestors were no better (not a bit) than they should be; present lot much better; future lots better still.

Oliver was elected on 4 June 1891. A copy of the Statutes would be sent him immediately, and prompt reaction followed. On 6 June he wrote to Lodge:-

"The Secretary R.S. has sent me a sort of Habeas Corpus:-

Yet one thing More  
Before  
Thou perfect Be  
Pay us three Poun'  
Come up to Town  
And then admitted Be  
But if you Wont  
Be Fellow, then Don't.

"I don't object to the three poun' [13]; but the exhibition clause is quite new to me. It is made a sine qua non of admission to fellowship. Now it is one thing to go to the Society because you have a right to go, qua Fellow, but quite another thing to be ordered to attend to be admitted as a Fellow, else null and void. Is it serious, or shall I let it slide and take no notice?

"The Statutes are amusing; and I felt inclined to 'contemptuously and contumaciously' [Statutes, Chapter V] revile the Society in their own words.

"I have been slaving away at my paper; expanded it to 45 pages, and now I see in the Statutes I may lose my labour. It may not be printed."

Part I of his paper "On Operators in Physical Mathematics" was received by the Royal Society on 15 December, 1892, and was published in Vol. LII of 'Proceedings' on 2 February 1893. Part II was received 8 June, 1893 and published on 15 June in Vol. LIV. The speed at which Part II passed through the printer's hands was very remarkable.

A Part III was sent to the Royal Society, but the Society declined to print it. It was later returned to Heaviside. Its rejection was a source of intense annoyance to him. Whether its substance can be traced among the papers he left remains to be seen.

The number of Fellows elected at any annual election is small compared with the number of Candidates, and thus failure to secure election must be the lot of the great majority. The list of Candidates from which 15 Fellows were elected in June, 1891, contained 68 names. Heaviside was elected at this his first and only 'go'. In the list were Silvanus P. Thompson and Joseph Larmor. Larmor was elected in June, 1892 at his second 'go'; Thompson was elected in June, 1891, at his third go.



**Oliver Heaviside, the man**

G.F.C. Searle (Ed: I. Catt)

*CAM Publishing*

1987, 79pp. £12

No full biography of Oliver Heaviside has been published. When that gap is filled, these recollections by G.F.C. Searle will be an important source for the description of Heaviside's way of life. Heaviside endured, with wry humour, the discomforts of ill health and of various degrees of poverty; he made himself a prisoner in his own house, seeing fewer and fewer visitors. Searle was his last link with the academic world. Although Searle was one of the few who understood part at least of Heaviside's work, this book is concerned only with the person and not the work.

The manuscript of this book was completed in 1950, 25 years after Heaviside's death, and then remained unpublished for 37 years more; and it is no longer in its editor's possession. Inevitably one asks whether the text is genuine. Almost certainly, yes; Searle's style is inimitable, and so is Heaviside's in the letters that are quoted. But Searle told me in 1950, at the Heaviside Centenary meetings, that he had not been allowed to say all he had wanted to; and it may be that the manuscript now published is also incomplete. The editor of the book tells me that the manuscript was not a continuous whole, and that he placed it in order and omitted nothing except duplications. This I accept, but I wonder whether Searle, who was not a man to leave anything untidy, regarded it as still unfinished.

It is good to find that Heaviside could keep his spirits up by writing jesting letters; but it is exasperating that he chose to live an isolated life and so exerted far less influence on his contemporaries than he deserved to. The book is of interest to anyone who wishes to understand Heaviside's attitude to his contemporaries, and a delight to those who ever encountered Searle.

A.C. LYNCH

