

LETTERS HOME I:

E.T. Whittaker at Trinity College in 1896

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Sir Edmund Taylor Whittaker FRS was remarkable for the breadth of his interests. He left a legacy of books on a wide variety of topics: analysis and special functions, applied mathematics and analytical mechanics, mathematical physics and relativity, astronomy, numerical analysis and actuarial mathematics, and philosophy.

A Course of Modern Analysis (1902) brought modern treatments of complex analysis into the English mathematical scene. At the end of the last century the general theory of functions as developed by Cauchy and Weierstrass was little known in Great Britain. Although Forsyth's treatise had appeared it did not present the subject for undergraduates whereas Whittaker's book (the first edition was due to Whittaker alone) grew out of a new Tripos course he had developed. He often related how at the time he sat the Tripos examination Cambridge mathematicians were speaking of "Cocky's" theorem [6].

What Forsyth and Whittaker did for complex analysis, Whittaker did alone for mechanics in his second book Analytical Dynamics (1904). This covered classical mechanics from Lagrange through Hamilton to Poincare. It was here that he made the much-quoted remark that "the whole course of a dynamical system can thus be regarded as the gradual self-unfolding of a contact-transformation".

In 1910 he published A History of the Theories of Aether and Electricity, a revised and enlarged second edition appearing in 1951. With G. Robinson he wrote The Calculus of Observations (1918) in response to the needs of actuarial students. In later life he wrote several pamphlets on science, philosophy and theology.

Whittaker, hereafter ETW, was born on 24 October 1873 in Southport, Lancashire. His father John was a railway engineer and contractor. His early education was at home with his mother Selina. At the age of eleven he went to the Manchester Grammar School, an academically outstanding school. He won an entrance scholarship to Trinity College and went up in 1892. In 1894 he was awarded the Sheepshanks Exhibition in Astronomy, to be given to the student best versed in Astronomy, theoretical and practical.

He took Part I of the mathematical Tripos in 1895. At this time the Wranglers were still placed in order of merit and there was considerable pressure to produce the Senior Wrangler. This resulted in a system of coaching for the Tripos examinations that had, according to Snow [10], "effectively ruined serious mathematics in England for a hundred years." ETW was regarded as a potential Senior Wrangler and placed with Dr Webb, to whom most such students were sent. After 2 years ETW, A. E. Western and some of Webb's other pupils had left Webb, intensely disliking his

methods of cramming them with old tripos problems.

“An exceptionally strong year”

Hardy [4] described the class of 1895 as an “exceptionally strong year”. The three favoured candidates were T. J. I’A. Bromwich, J. H. Grace and ETW. Todd [14] records that rumour has it that Grace was in the lead after the penultimate paper but celebrated a day too early. The Senior Wrangler was Bromwich with Grace and Whittaker bracketed in second place.

Bromwich was elected to a Fellowship of St John’s in 1897 and to the Royal Society in 1906. He published a treatise on infinite series and several papers on analysis but in Hardy’s opinion there was little of note after 1908. Hardy praised his technique but felt that he could not “think vaguely” enough to do really original research. Bromwich suffered ill-health and mental instability, culminating in his suicide in 1929.

Grace was a colourful figure “with a great love and expert knowledge of the Turf”. J. A. Todd wrote “throughout his life he missed opportunities of achieving the greatness of which he was capable through his intemperate habits”. We get some idea of what Todd thought he might have been capable of from the facts that he was elected to a Fellowship of Peterhouse in 1897 and to the Royal Society in 1908. In 1922 he suffered a breakdown which caused permanent withdrawal from academic life, although he did return to mathematical research briefly in the late 1920’s.

Three other members of that class were elected to the Royal Society: the eighth wrangler F. W. Carter (engineer), B. Hopkinson (engineer) and the tenth wrangler Alfred Young, who spent ten years in academic life before pursuing a more leisurely career as rector of a country parish whilst still working on groups and invariants. The twelfth wrangler Maclaurin became Professor of Mathematics in the University of New Zealand in 1898 (only two years after he completed Part II), moved to Columbia University, New York, in 1907 and was appointed President of MIT in 1909.

ETW remained at Cambridge during 1895-6, studying for Part II of the Tripos and working towards a fellowship that would enable him to start out on his career. The letters reproduced here were written to his mother during 1896 and surfaced in a Sheffield bookshop. They have no mathematical content, there would be little point in writing about mathematics to his mother who was not a mathematician, but they are about mathematicians. They paint a vivid picture of ETW as a deeply religious man, sharing a keen interest in gardening with his mother and retaining links with his old school through the Old Mancunians. They give some insight into the life and personalities at Cambridge at the turn of the century. Finally, we see here that even someone of ETW’s ability had serious concerns over finding a fellowship to enable him to start on a scientific career, a problem which still worries us today. Except for the one letter from Marlborough they were all written at Trinity College.

"I arrived safely"

Jan 17th '96

My Dear Ma,

I arrived safely on Tuesday. Dockray and Chapman, two Old Mancunians who are in their first year at Trinity, travelled with me from Manchester to Cambridge. I have sent in the tract I wrote to my tutor, Mr Rouse Ball, before sending it in for the Isaac Newton; he is going to let me have it back to-morrow (Saturday) so I may be able to send in the application for the Isaac Newton on Monday. The applications have to be in by the 24th.

Hawkins has come up with his knee still rather bad; he can walk about, though very lamely, but can't play any games. He brought up some mince-pies which he said his aunt had made; he gave me one which was very good.

7. I saw Thornton to-day, looking very well. I have started having lunches at the usual place: Thompson has turned up, but Western won't I think turn up till to-morrow night. Carson is unwell again this term and won't come up, but says he will be able to work at home.

How are the nightshirts going on? Are you going to send them by post? Hoping you are all well.

I remain
Yours affectionately
Eddie

Has the picture come from Shells. I suppose I ought to pay for it: remind me when I come back. E

Walter William Rouse Ball (1850-1925) went up to Trinity College in 1870. His teachers included J. W. L. Glaisher and H. Lamb. He was Second Wrangler in the Tripos of 1874 but was shortly afterwards awarded the First Smith's Prize, and elected as a fellow of Trinity in 1875. For a while he pursued a career as a barrister but returned to Trinity as a lecturer in 1878. He is now remembered for his books "A Short History of Mathematics" (1888) and "Mathematical Recreations and Problems" (1892) as well as various histories of Trinity College.

A. E. Western took up a career as a solicitor and was a pioneer of the legal aid system. In his Law Society exams he was awarded the Clifford's Inn Prize, and then entered his father's business. He remained interested in mathematics and served as treasurer of the London Mathematical Society from 1913 to 1950. His work on computational problems in number theory was recognized by the degree of Sc.D. by Cambridge University in 1910.

The Isaac Newton Prize was a one year award of £200, it would certainly have provided ETW with financial security for a year.

"I am the only person at Dr Hobson's lecture this term"

Jan 24th, 1896

My dear Ma.

I sent in my papers for the Isaac Newton last Wednesday. The last day for sending in is to-day, but I don't know when the result will be out: I think probably not for some weeks yet.

I went to Rouse Ball's on Tuesday and there played a game I had often heard of before, but never seen. It is called "Badminton", and is something like Lawn Tennis only played in a building, so that it is suitable for a wet day. Afterwards he showed me a collection of engravings of famous mathematicians.

Mules stayed a night in Cambridge on his way to Lincolnshire, and came to see me on Tuesday. He seems pretty well.

Western came up on Tuesday. I went a walk this afternoon with Robinson the African explorer, who is at Trinity now writing a book on the Hausa country.

I am the only person at Dr Hobson's lecture this term, so we have the lecture room to ourselves, and if I were to stay away there wouldn't be a lecture. He lectures just as if there was quite a crowd there.

I saw Hearnshaw in the street the other day. He said he came up last Saturday.

I forget whether I told you in my last letter that Godfrey, my competitor in College Scholarships, Sheepshanks, and Tripos, has just got engaged to be married. On hearing this, and also that Benson was likewise engaged and that Higley, another friend of ours, had got married in the Vac., Western turned to me and said

"There seems to be a lot of it about. Are you also engaged?" I replied

"No: are you?" This appeared to reassure him.

I don't see how anything about Lord getting his B.A. could have appeared in the Visiter, as so far as I know he hasn't got it yet and won't get it till he passes some more exams in June.

Yours affectionately,

Eddie

Rouse Ball's collection of portraits of mathematicians was one of the most extensive ever made. It was exhibited at the Napier Tercentenary Celebration in Edinburgh (1914) and a catalogue of the portraits was printed in the Handbook to the Napier Exhibition.

Charles Henry Robinson's book "Hausaland, or Fifteen Hundred Miles Through

the Central Soudan" was published by Sampson Low in 1896. It is long out of print and copies of the first edition are now scarce and expensive.

"The New Photography"

Jan. 31 1896

My dear Ma,

We have had another addition to our lunching party now, as Ryder has joined us. He has some very peculiar ideas about food, and lives on meat and fruit, never eating anything like bread, rice or porridge. He appears to thrive on it, and has only two meals a day.

I don't know whether you remember the Winter Aconites I grew for two or three years in East Bank St, yellow flowers like buttercups only standing about an inch from the plantpot and flowering in February. I see the bank round the John's "wilderness" is planted with them so as to be covered with yellow; it looks very fine now just as they are coming into flower. I should think some would look nice in the grounds of the Hall. What was the matter with Mr Black?

I went to a lecture last Monday by Prof. Thomson, explaining the new photography. He showed us a photograph of some coins inside a purse, the purse being closed when the photo. was taken.

I have received an invitation to lunch at Sir Robert Ball's on Sunday next.

Higginbottom has written inviting me to spend Sunday with him next week. He is to give the address at a Children's Service, at the church he goes to now, next Sunday, so I expect he will soon get into regular work there. The University Temperance Council has been disappointed in its speakers, four having said they couldn't come one after another. I was very glad to hear of Papa's promise for St Philip's.

I hope you are all well, I remain

Yours affectionately,
Eddie

It is interesting to find Professor Thomson explaining the "new photography" in January 1896. It was only in 1895 that W. K. Röntgen had discovered X-ray photography and even when Thomson wrote the entry for Encyclopaedia Britannica in 1909 they were still referred to as Röntgen rays. These investigations led to Thomson's discovery of the electron in 1897. His treatise "The Conduction of Electricity Through Gases" appeared in 1903.

Sir Robert Ball was at this time Lowndean Professor of Astronomy, having previously been Professor at the Royal College of Science, South Kensington (1867-1874) and Astronomer Royal for Ireland (1874-1892). He had succeeded John Couch Adams

in the Lowndean Chair. In Ireland he had replaced W. R. Hamilton, and in turn been succeeded by Charles Joly. He was also a vigorous populariser of astronomy, author of books such as "The Story of the Sun" and "Great Astronomers".

ETW refers to Charles Godfrey as "my competitor...". Godfrey had been placed fourth in the Part I Tripos, just below Grace and Whittaker, and was awarded the Isaac Newton Studentship in 1898. However he left academic life to become headmaster of the Royal Naval College, Osborne, in 1905.

"The question of giving women degrees"

Feb 7th 1896

My dear Ma,

I hope to go to Higginbottom's to-morrow (Saturday) afternoon and spend Sunday there, coming back by the first train on Monday morning. He has written to say that Moran (an Old Mancunian who was at Oxford and then tutor of the O.M.S. College at Islington, and who you will remember called at B. Hall about two years ago, with a very big St. Bernard dog) is dining with them on Sunday, so I am hoping to meet him again also.

I saw Hearnshaw last night. He was sported, but opened the door when I knocked. He then explained that he had sported because on coming in from cycling he thought it wasn't worth while putting on his ordinary clothes again, so he was working before the fire in a dressing gown.

I enjoyed the lunch at Sir Robert Ball's very much. He was telling us some very funny stories a good part of the time.

I am glad to hear the garden is going on well. Perhaps there will be something or other ripe by the time I come back if the weather keeps as warm as at present, though I can't think what unless it is peas. Tell Selina that I'm afraid I shan't be back in time for the mock trial on March 4th. There is a great agitation going on here now about the question of giving women degrees. Benson hasn't been over since I came up. I daresay his term will begin later than ours.

The Old Mancunian's Meeting is to-morrow night, but I shall have to miss it, as I hope to be at Higginbottom's.

Hoping you are all well, I remain

Yours affectionately
Eddie

I haven't heard anything more about the Isaac Newton.

Sir Robert Ball and ETW were to remain close friends until Ball's death in 1913. ETW prepared the Catalogue Raisonné of Balls papers which is included in his Letters and Reminiscences [2].

unless you can add to this para

The Shorter OED explains that "sported" is University slang for keeping one's door shut as a sign that one is absent or does not wish to be disturbed, "to sport one's oak".

The obituaries for ETW do not give details of any brothers or sisters but the impression given by these letters is that there were two sisters "Sissie" and Selina. Selina appears to have been a younger sister and ETW played an active part in her mathematical education.

Feb 12th '96

My dear Ma,

Please accept the enclosed £1.

I called on Sir Robert Ball last Sunday.

Dr Hobson has invited me to a feast in Christ's next Tuesday. I was asked to dinner at John's last Wednesday. To-morrow is the middle of term.

Thornton was up last weekend - he stayed in rooms on the other side of Cherwell's Ct.

Mr Theo. H. Davies was up last weekend also - I had breakfast with him at the "Bull" Hotel on Monday. They are not leaving Southport till the end of March.

I am to be proposed as a member of the London Mathematical Society this week. My paper to the "Messenger of Mathematics" has been accepted, and is being printed.

I had a game of Badminton with Mr Rouse Ball a few days ago. Hadn't you better be making arrangements for having the town's water in the garden? I should think the tap ought to be in the plantation, at the corner near the steps up to the front door. There are snowdrops, aconites, and a few anemones and coloured primroses, in bloom out-of-doors in the fellow's garden.

*Yours affectionately
Eddie*

ETW was accepted as a member of the London Mathematical Society, serving as President in 1928-9.

Feb 28th

My dear Ma.-

I was rowing in the Ancient Mariners again one day this week. The first meeting of the University Temperance Association is next Monday, when my African friend Robinson is to speak on "The Liquor Traffic with Native Races".

I saw R. H. D. Mayall of Sidney last night but one. He tells me that he expects a fellowship will fall vacant a year next June, and he expects to get that. It will be worth £250 a year then, I think, as Sidney fellowships come from some property at Grimsby which is going up in value. The fellowships at St John's are only worth about £60 a

year now I believe.

I called on Sir Robert Ball's last Saturday.

I haven't heard anything about the Isaac Newton, though I expect it will be out by the end of the term. Mr Hatfield sent me some papers, together with a form to be filled up saying that one promised to give so much to the Schools Fund. I hesitated some time as I knew Papa had given, but finally I ought and could afford £1 so promised that.

I am glad to hear about the bees from Mrs Isherwood, and hope they will live.

I think term ends a fortnight to-day.

*Yours affectionately,
Eddie*

Although there is no further mention of it in the letters, ETW's application for the Isaac Newton Studentship was unsuccessful. In 1896 it was awarded to J. G. Leatham who was bracketed fourth wrangler in 1894 and who had been placed in Class 1 Division 1 for Part II in 1895.

Mayall had been bracketed second wrangler in 1891 and was awarded a Smith's Prize in 1893, the Smith's Prizes were awarded for an essay on a mathematical subject and were frequently a more reliable indication of originality and research ability than the Tripos lists.

March 5th 1896

My dear Ma,

The arrangements for next term's lectures have just been made. I have been appointed to give two courses, one on Analysis and one on Astronomy. The Analysis lecture is to some very good men - the scholars of the first year in fact.

Prof. Klein of Göttingen is to come to Cambridge on Tuesday. Professor Forsyth has promised to ask me to breakfast to meet them, and Sir Robert Ball has invited me to an "At Home", also to meet them.

Nansen, the Arctic explorer, is to receive an honorary degree on the 16th.

I think Wilkinson has some pupils at Caius.

An album is being made of past and present Fellows, to be put in the College Library. They want cabinet photos, and I expect will want platinotypes, as all other kinds of photographs fade in the course of time. So I expect I shall have to be taken again.

When was Percy Isherwood's farewell at St Philip's, and what did they give him?

I should think it will be well to get the town's water in the garden soon, as we may want to sow seeds on the ground which they will take up in laying the pipes. The

first daffodils came into flower to-day in the Fellow's garden. Are the ones which are coming up the ones you bought from Drake House?

*Yours affectionately,
Eddie*

Tell Selina I want her to finish the Additional Propositions and to read Book XI before I come back. Ask Shaw what the Young Men's stall is going to do at the Bazaar.

"Professor Klein of Gottingen"

March 12th '96

My dear Ma,

I am very busy now with the visit of Professor Klein, of Gottingen in Germany. I have been talking to him and showing him about for several hours to-day, and have to go out this evening again to a reception in his honour, so can scarcely find time to get my lectures ready for to-morrow.

I hope to return to Southport on Saturday next, March 20th, but may possibly not come till the Tuesday after. Tell Selina I want her to have finished the Euclid book when I come back, and am glad she liked taking Sissie's class.

The American Ambassador (Bayard) and French Ambassador (Baron de Comcel) were here yesterday, to receive honorary degrees. Also Professor Zahn of Erlangen. Klein and Zahn dined in Hall at Trinity last night.

How has Sissie's capital gone on?

I think you had better borrow from Papa till I come back, and then I can repay him. But I wouldn't buy silver spoons unless Mrs Taylor wants the money badly, for you know how I dislike gold watches, silver spoons and jewellery generally.

*Yours affectionately,
Eddie*

My paper on astronomy has been published in the "Messenger of Mathematics".

P.S. I'm afraid I don't want Mrs Taylor's watch- I wouldn't have a gold watch given me; when I get one it will be a Waterbury and won't have to cost more than £1. I am writing out a short paper for publication in the "Messenger of Mathematics." E.

Although Felix Klein is now remembered mainly as a geometer, Baker [1] points out that at this time Klein's interests were in applied mathematics. In 1895 he had undertaken responsibility for the section "Mechanics" in the Encyclopaedia of Mathematics and its Applications. In 1896 he was delivering lectures on The Mathematical Theory of the Top at Princeton University, and in 1897 he commenced work

with Sommerfeld on their treatise on dynamics. ETW's early work includes planetary theory, periodic orbits and the three body problem so they would have had much to talk about. When ETW wrote his tract on Optical Instruments in 1907 it included Klein's application of the imaginary circle at infinity to prove that no optical instrument, other than a plane mirror, can be constructed to transform all the points of the object space into the image space.

May 1st '96

My dear Ma,

I suppose as I am writing this, you and Sissie will be at the "At Home". I hope you will enjoy yourselves.

I have been invited to tennis and supper at Rouse Ball's next Tuesday.

You will be glad to hear that I didn't take cold through leaving off my singlet, but it has been very cold this evening so I have put on another (flannel) jacket underneath my ordinary coat, and lit a fire. I was without a fire until this evening.

Kelsey, who you will remember was 12th wrangler and used to live in my present rooms, has got an appointment as Chief Mathematical Master at Leeds Grammar School, and has gone there. I don't know how much salary he gets, but should think about £200 a year. Cowell, who was Senior Wrangler and Isaac Newton Student, has given up his Studentship and gone to an astronomical post at Greenwich. Mules is calling at Cambridge next Tuesday on his way to Lincolnshire.

I am thinking of getting "Hovis" bread in future. It is a kind of specially made brown bread, and several of my friends have recommended it. I suppose you will be very busy with the garden about now. I sowed some of the Honesty seed in the bed under the Selina Pippin, next to where you had sowed the celery, and some in the bed under the John Crab.

The weather is rather showery. I haven't seen Hearnshaw, and doubt whether he has come up yet.

Hoping you are all well, I remain

Yours affectionately,
Eddie

P. H. Cowell was the Senior Wrangler in 1892 and awarded the Isaac Newton Studentship in 1894.

"The Smith's Prizes for 1896"

May 8th 1896

My dear Ma,

I haven't bought another singlet, but am wearing my boating sweater as a singlet until the weather gets warmer. It does quite as well as a singlet, and is I think better suited to warm weather.

Thornton this morning brought 3 of his younger brothers to see me for a few minutes. They were stopping at Cambridge on their way from home to school.

It is expected that the result of the Smith's Prizes for the year above me will be out on Saturday or Monday. Adie and Leathem are I think most generally expected to get them, but Sedgwick, Philip, Lawrence, Campbell and Kelsey, are all supposed to have some chance. Thompson has joined us at lunch, so there are three of us again now.

Benson came up as usual from Ely last Saturday. He said he was going to Kettering to see about a curacy at one of the churches there. He hopes to be ordained in September I think. His engagement to be married has been broken off. Mules came up last Tuesday, on his way to the clergyman's with whom he coaches. He stayed the night in Trinity, as Western's guest.

I am sending off my Income-Tax claim to-night. The Senior Bursar has been rather a long time in giving me the certificate of having paid the money, or I would have sent the claim in sooner.

I enjoyed myself very much at Rouse Ball's on Tuesday; I have already had 4 invitation cards from them this term, - one for last Tuesday, one for tennis on Tuesdays and Wednesdays, one for "At Home"'s on Sundays, and one for an "At Home" on Thursday May 21st.

I am taking the College Bible-reading on Sunday, on I John II. If the weather keeps dry, you might water the seed-beds I made near the Selina Pippin and near the John Crab. I don't suppose the Honesty will have come up yet. Hoping you are all well.

Yours affectionately,
Eddie

When Rouse Ball died in 1925 it fell to ETW to write the obituary which appeared in the Mathematical Gazette. His appreciation of the hospitality shown to him by Mr and Mrs Rouse Ball is indicated by the following paragraph:

"In 1893 he succeeded Glaisher as Tutor of Trinity: and he and Mrs. Ball (to whom he had been married in 1885) soon won the reputation of being the best tutor and tutor's wife that had ever been. They built a house not far beyond the Trinity Fellow's Garden, in the new western suburb which had begun to rise when the compulsory celibacy of Fellows was abolished; and here they welcomed and entertained an

endless succession of pupils. Their charm as host and hostess was beyond all power of description: both of them were, I think, shy and reserved by nature, but shyness was swallowed up in goodness of heart."

May 15th 1896

My dear Ma,

The result of the Smith's Prizes came out last Saturday: Adie who was bracketed Senior Wrangler, got the first, and Lawrence (bracketed fourth) and Campbell (bracketed eighth) were bracketed for the second. It is a great disappointment to Sedgwick, who was bracketed with Adie in the Tripos, and to Philip, who was third in the Tripos. I suppose this time next year the results for our year ought to be out. I have got an invitation to an "At Home" at the Master's Lodge on Wednesday the 27th.

Western's mother and one of his sisters intend coming up for the May week. Western is finding lodgings for them.

The booksellers in Cambridge have all started giving 3d in the shilling discount. Formerly only one did, while the others only gave 2d.

The Prince of Wales was here to inspect the University Volunteers. He was in full uniform, and I saw him mounting his horse in Trinity after he had been lunching. He rode through New Court and Trinity Avenue and along the Backs, in a blue uniform and on horseback.

The Mathematical Tripos Part I begins on Tuesday. Part II doesn't begin till a fortnight next Thursday. My neighbour Hawkins has been playing cricket very well in College matches this term, but is at present unable to play, as his knee has gone rather wrong again.

I had a letter from Higginbottom two days ago. He says that Miss Higginbottom will be at Burnley till October.

The Mancunian meeting hasn't been held this term yet, nor the Mancunian photo taken. Should I get one this year again, for the adornment of the drawing room!

The open air meetings on Sunday nights near the Roman Catholic Church have started again. The speakers last Sunday were Thornton, Woods, Macnutt, Emerson and myself.

I saw Wilkinson of Caius last Sunday. He has the second part of his Tripos on. How is the grass growing on the bank facing the Estate office, which I sowed the seed for?

Hope Sissie enjoys herself at Briggs's. It ought to be very nice there now. Tell her that if she introduces herself to Clara as the sister of "Emma" and of "Uncle Edmun" she will be sure of a welcome.

Yours affectionately,
Eddie

In his letters ETW refers to 'Sissie' and Selina, Selina also being his mother's name. It appears that outside the family Selina was referred to as Emma.

"You will no doubt be rather surprised..."

The College,
Marlborough,
June 11th 1896

My dear Ma,

You will no doubt be rather surprised to get a letter from me from here, but on Sunday a telegram came to Sedgwick of Trinity from the Headmaster of Marlborough asking him to find somebody to take a mathematical class at Marlborough for a short time, as one of the masters was away. So Sedgwick asked me if I should like to go and I accepted and came here on Monday. As my Part II finished on Saturday, I should have had nothing to do in particular at Cambridge this week, so I thought I might as well be here. I expect the Headmaster will pay my railway fares and other expenses and give me something besides. The life here is very nice. Marlborough is in Wiltshire, on the borders of Savernake Forest. It is rather hilly and I think bracing. There are about six hundred boys, all boarders, and aged from about 12 to 19. I have a very nice set of rooms, (sitting room, study, coaching-room, bedroom, bathroom and a room which is used as a "dark room" by its usual owner, who is a great photographer and has many of his photographs framed in the room.) I have two meals a day with the masters, and one meal a day with the masters and boys together, and can have tea or coffee in my own rooms.

I expect to go back to Cambridge on either Saturday or Monday, so shall have been here a week, or a little less. so address your next letter to Cambridge. As I have still 5 nights more to be in Cambridge to keep my term, I shan't come to Southport till a week on Saturday or a week on Monday. My result comes out on Tuesday. Your letter was forwarded to me from Cambridge this morning. I think I did pretty well in the Astronomy throughout, and don't know how I shall be marked in the other division.

Is my wild rose in flower?

Hoping you are all well, I remain

Yours affectionately
Eddie

July 24th '96

My dear Sissie,

It was Mama's birthday yesterday: I am afraid I haven't got her any birthday present, but the automotor when it comes will have to make up for past years in the way of presents.

Nutt wrote to tell me that the St. Philip's crew had lost, but only very narrowly, owing to the illness of 2 of the crew. It is to be hoped they will win it back again next year.

Western is going down for good next Thursday or Friday. (This means that he is going to Switzerland with a family party of 10, and isn't going to come back till he starts as a solicitor in the autumn.)

The 'Orl is indeed a magnificent place when we can invite a whole family like the Briggses to stay. Are they coming? I am very much surprised about Margaret. Let me know how she is getting on.

I haven't got the Tyson Medal yet, but have been to see about it, and the University Marshal said he would try to hurry it up. I must see him again if I don't hear in another day or two.

Barnes and Carson, who are neither of them up for the Long, have written to ask me to send some of their books to them, which I have done.

It was the Jesus Lane Sunday School Treat last Tuesday. I was present and tried to make myself useful, as at other treats, though not so prominently.

I expect Higginbottom will be staying in Cambridge next week. He asked me to look out some lodgings for him, so I got some over the shop at the corner of St John's St and Bridge St. Hope Papa is better.

Your affectionate brother
Eddie

The Tyson Medal arose from the estate of Henry Tyson, who died in 1852. The bequest was subject to the life interest of his widow, who died in 1880, "but by inadvertance no steps were taken to establish the medal until 1893". The first award was in 1895 and ETW was the second recipient. The medal was awarded to that candidate for Part II of the Mathematical Tripos who acquits himself best in Astronomy, provided his work be of sufficient merit and provided further that such candidate be placed in the first class. It was not awarded again until 1904.

There are a couple of remarks on "the automotor" in the letters, it looks as if ETW had a long standing arrangement to provide one once he had established himself.

"Whewell's Court is in a great mess"

August 5th

My dear Ma,

I hope Sissie enjoys her out to Hebden Bridge. Tell her I haven't seen a Longton photo, and should like her to send me hers. Higginbottom went back on Monday, and his exam begins to-day (Wednesday). I think he enjoyed his visit. We saw over all the

colleges, and the University Library and Science Laboratories, and we went to Trinity Church on Sunday morning and Trinity Chapel on Sunday evening. He did a good deal of work for his exam. while he was up, so with working and sightseeing our time was fully occupied.

I have seen a long letter from Herbert Wolstenholme to Ifiginbottom. He is now at Kimberley, on the border of the Orange Free State, in South Africa, and is learning the Gentlemen's Outfitting trade. He seems contented and happy, and has joined the Presbyterian Church and a Christian Endeavour Society out there. Have the Philippians who went to Keswick returned yet?

How is the American Blackberry going on?

I went to Tea and Tennis at Rouse Ball's yesterday. Nearly all the paths in the College are up, as they are laying the drains. Whewell's court is in a great mess altogether, but I think it is expected that all the drainage work in Trinity will be finished by the end of the Long.

Hoping you are all well,

Yours affectionately
Eddie

P.S. How long has Selina holiday for, and what is she going to do in it?

"A large rat"

Aug. 28th 1896

My dear Ma,

You will be glad to hear that my dissertation has got on very well; it will be 76 or 77 pages long; I have written out 71 pages already, and hope to do the other 4 or 5 pages to-morrow morning, so as to send it in to-morrow afternoon. I hope to come back to Southport on Monday, by the usual train.

*2/3 plain
the
named?*

The dissertations this year seem to be very long ones. Two years ago, D. H. Moore got a fellowship on a dissertation of about 40 pages, but this year Adie is sending in about 300 pages, and Lawrence about 180 pages, and even Godfrey, who like me is only having his first shot at the fellowships, is sending in 200 pages, but then most of his is a review of the present state of things in his subject. and is not original work, so won't count, while my 76 pages are all original. Campbell is sending in about 70 pages I think; I don't know how long Sedgwick's will be, but should think about 50 or 70 pages. But of course the length doesn't count at all.

J. D. Thompson and Rumsey have gone down for good. They have each got appointments, worth about £180 or £200 a year to begin with. Thompson's is at Firth College, Sheffield, and Rumsey's is at the Northampton Technical School. Rumsey was 9th wrangler and Thompson 16th wrangler in my year.

I have been invited to lunch with the Junior Dean (Platts) on Sunday. Everybody else on my staircase has been gone down all this week. I have had a lot of trouble with mice and rats. The cat (Carsons') caught a mouse yesterday, and a large rat was caught in a trap by the bedder in one of the other gyp-rooms on the staircase, the day before yesterday. Wilkinson didn't get the lectureship, but has got a tutorship for the Vac. Hoping to find you all well on Monday,

*Yours affectionately,
Eddie*

"There are 16 candidates"

Oct. 4th '96

My dear Ma,

There are 16 candidates for the fellowships: 7 mathematical, 5 classical, 3 science and 1 history. I have only had 2 papers so far, but there are three more to come. I believe the exam. doesn't count for very much though.

I have been invited to dinner at the Master's Lodge on Tuesday next. I believe all the other mathematical candidates are going.

The second and third year undergraduates are not coming up till a week next Tuesday. The freshers have mostly come up already. There are two on my staircase - Smith, a Mathem. exhibitioner, from Harrow School, and O'Malley, a classical scholar, from Norwich school.

I am glad to say that none of my plaques or opals have been lost or broken during the drainage operations in the Long.

Cecil Lillie, and old friend of mine here who has been at St. Bartholomew's Hospital for the last 2 years and is now a qualified doctor, is up here and is coming to tea with me this afternoon.

I don't expect my College Bill for another week, but when it comes I hope to send Papa some money.

*Yrs
Eddie*

"I am very thankful"

Oct. 12th '96

My dear Ma.,

The fellowships were awarded to:-

W. S. Adie
E. T. Whittaker
J. A. Nairn.

I am very thankful for the result, which came out at half past two this afternoon.

The letter you forwarded was from Herbert Wolstenholme in S. Africa. He must have enclosed it in a letter to one of his friends in Southport, and told the friend to put a penny stamp on it and forward it to me.

Hope Sissie enjoyed Mr Newbery's sermon.

Western has been up for the weekend, and gone down this afternoon.

I am very busy with Fellowship congratulations, so must close.

Yours affectionately,
Eddie.

P.S. I feel awfully delighted at Eddy's success. It is richly deserved and it makes me feel quite happy. Hope you are all well. With kind regards, J. A. Wilkinson

"I get my dinners free now"

Oct. 18th '96

My dear Ma.,

I received the coat all right, and have been wearing it since. It will save my other clothes.

I dined at the High Table for the first time last Tuesday, and to-day, at the Memorial Service to the Archbishop of Canterbury, took my seat for the first time in the stalls in chapel. The memorial service was attended by a large number of dons from other colleges.

I enclose a card of our Temperance Society's meeting this term.

I get my dinners free now, so my college bill will not be very heavy I expect; but my scholarship drops altogether, and I don't get any money from my Fellowship till a year next Christmas, when I hope to receive the £250 for the year 1897. I don't get any payment for 1896 at all. So I should have been in rather low water until then, if

I had nothing else; but I am thankful to say that I have to-day been appointed by the College to give a set of lectures this term, beginning on Monday. I am to lecture 5 days a week, one hour each day, from October 19th to December 4th, so there will be about 34 lectures, and I am to receive £30 from the College for the whole course; so that is very nearly £1 an hour; and it is to be paid I believe in the Christmas bill or in January at any rate, so I hope to be all right so far as regards money next year, as they may possibly give me another course of lectures next Term. I am deeply thankful about the whole matter. The lectures are from 9 to 10 every morning except Saturdays and Sundays, in one of the College Lecture Rooms.

I hear that Godfrey has nearly completed arrangements for going as a master to Harrow in a year or so.

My bedder wants you to send some tea-cloths. If you remind me when I come back I will pay for them. The one you sent in the Long is all right, but the older ones are quite done.

Hoping you are all well,

*Yours affectionately,
Eddie.*

*P.S. My income next year, from the Fellowship, Lecturing, and Sheepshanks, will I hope be over £300, so perhaps I may be able to afford the automotor.
E.*

Nov. 15th 1896

My dear Ma.,

I have at present got 6 pupils belonging to one of the chaplains of Trinity, who is ill. I have been asked to take them for the rest of the term, so I expect he will give me half of the fees they pay him for the whole term. I take 4 of them together and the other 2 together, so it only means an hour a day altogether. Norman Burgess called on me the other evening. He says he hasn't been at Middleton for several years now. He lives about 26 miles from Cambridge now.

I was at a dinner at the Master's Lodge a week yesterday, and had the pleasure of sitting next to the Bishop of Likoma (Central Africa). Last Wednesday Manley took me to the "Audit Feast" at Christs'. They have several curious customs there, for instance, they pass round what is called the "Loving Cup", which is a big silver beaker filled with wine of some kind. It is passed round the table, and as it comes to each man he stands up and bows to the people on each side of him, who also bow and stand up. Manley and I being teetotalers didn't drink it, but we stood up and bowed like everybody else.

I called on Sir Robert Ball this afternoon, and met the Astronomer-Royal there. He is up for the weekend I think.

I hope to go down home in about 3 weeks time - possible three weeks next Tuesday. Selina seems to be getting on very well with her work. Do you know if Mr Cleworth at Middleton is doing anything in connexion with the "Three Years' Enterprise" of the Church Missionary Society?

Kindly remember me to Auntie Emma, and Joseph and Benjie, if you should see her.

Yours affectionately,
Eddie

"I have had to refuse"

Nov. 22nd 1896

My dear Ma.,

Western is up here at present: he came up on Friday evening, and intends to go back to-morrow (Monday) morning.

A boy named Lever from the Manchester Grammar School has been up this week, trying for the Mathematical Scholarships at Christs'.

Last Thursday I dined at the Sidney Audit Feast with Mayall. He still hasn't got a Fellowship, as there isn't one vacant to give him, but I think there are some to fall vacant next year.

I hear that the Grammar School got a half-holiday in honour of my Fellowship.

To-day I went to the Presbyterian Church in the morning, and had lunch with Rouse Ball afterwards. Benson is I think to be ordained shortly.

I expect to return to Southport about a fortnight next Wednesday. I am very thankful to say that my dissertation for the Smith's Prize is getting on very nicely. It has to be sent in about January 7th. It takes up a good deal of time, so I have had to refuse some more pupils who wanted to coach with me. I have at present the Smith's Prize to write, and Forsyth's lectures to attend, and have to lecture 5 days a week, and have one pupil of my own and 6 pupils belonging to a coach who is ill. I have had them for a fortnight now, and shall have to keep them till the end of term.

There is a Professorship of Mathematics vacant at the University College of North Wales, Bangor, and Godfrey is applying for it. I thought of applying as the stipend is £400 a year and I should have my fellowship as well, but Ball advised me not to, as he said it would be better in the long run to apply for the Isaac Newton Studentship here, which is £200 a year. An Isaac Newton Studentship falls vacant next term, so I now think of applying for it.

Remember me kindly to Balls. The *Conversazione* is Wednesday December 23rd.

Yours affectionately,
Eddie.

The comment "I have had to refuse some more pupils" raises an interesting possibility. G. H. Hardy and J. H. Jeans went up to Trinity in 1896. Like ETW before him, Hardy was regarded as a potential Senior Wrangler so sent to Dr Webb "to be trained as a racehorse, over a course of mathematical exercises" (Snow [10]). He was so annoyed with Webb's methods that he even considered changing to history, but eventually his director of studies sent him to A. E. H. Love. It may well be that ETW was approached to take on Hardy as a pupil but had to refuse.

Although ETW maintained strong links with his old school through the Old Manxunians it is still surprising to read that his former school declared a half-holiday in honour of his Fellowship. It suggests that academic achievements were more highly rated then.

Godfrey did not get the Chair at Bangor. The successful candidate was G. H. Bryan who was 5th wrangler in 1886 and had been awarded the Smith's Prize, jointly with A. C. Dixon, in 1888. Elected to a Fellowship of Peterhouse in 1889 he had written, with C. W. C. Barlow, "Elementary Mathematical Astronomy" in 1893. Since Bryan was working in astronomy Ball would surely have known about his application to Bangor.

"I have been to-day appointed..."

Dec 11th 1896

My dear Ma.,

You will be glad to hear that I have been to-day appointed an Assistant Lecturer of the College, and shall have to give 2 courses of lectures next term. This means that I shall not be able to go in for the Isaac Newton, as I shall have to give at least two courses each term. I shan't be able to come back to Southport till Tuesday or possibly Wednesday, as I shall have to make arrangements about these lectures, but I shall have to be back in time for the debate at St. Philips on Wednesday. I have been so busy cramming my pupils for their exam. to-morrow that I really haven't had time to look at Selina's work, but may possibly get it done to-morrow.

*Yours affectionately,
Eddie*

"Infinite capacity for making things go"

Sir Robert Ball had been succeeded by Charles Joly as Astronomer Royal for Ireland. When Joly died in 1906 the electors for the post would surely have written to Ball seeking his advice on a replacement. Ball wrote in this connection [2, p152]

"Now let me commend to your most special and careful attention my very great friend Whittaker. He is the only man I know of who can properly succeed Joly. And

the place will suit him in every way. He is a keen gardener and a man who has infinite capacity for making things go. Then as to his scientific achievements, he knows more of the mathematical part of astronomy than anyone else in Great Britain, or if you like to add Europe, Asia, Africa and America I won't demur. A modest, charming man in every way. He has already made one discovery which the greatest mathematicians of the last two centuries would be proud to have placed to his credit."

The mathematical discovery that had so thrilled Ball was the solution of Laplace's equation [16]. "Every mathematician from the days of Laplace down would have been only too proud to have accomplished such a feat" [2,p.164].

Not surprisingly with a reference like this, Whittaker was appointed to the post. Although he had little practical experience in astronomy "tradition did not demand, and Irish weather did not allow, exacting routines of observing". He was provided with a charming house at Dunsink Observatory, just outside Dublin. Thus in 1906 we find ETW as a successor to Hamilton, indeed living in the very same house where W. R. Hamilton had done much of the work on analytic dynamics. The subject of which ETW was now the greatest living practitioner.

In 1912 ETW moved to Edinburgh to succeed George Chrystal as Professor of Mathematics, a post he held until his retirement in 1946. He built up a strong department, including the first mathematical laboratory in the country. He also held a unique position in the Edinburgh Mathematical Society, and was largely responsible for the introduction of the periodical colloquia of that society now held at St. Andrews (they were originally held at Edinburgh).

W. H. McRea wrote in the obituary notice [7]

"He was a deeply religious man. While his acceptance of the fundamentals of the Christian faith remained steadfast, his form of observance went through various changes until he was received into the Catholic Church in 1933. On the intellectual plane, I think he was led to this by his interpretation of church history, in which he read widely."

"While Whittaker's intellectual interests in mathematics, science and, in later years, in philosophical problems were phenomenally wide, his relaxations were extremely modest. He enjoyed music in his own home, mainly piano music performed by his wife and friends. His only hobby was the intense cultivation of a small garden, chiefly for the growing of species of *Lilium* of which he had some rare specimens. He found his chief human happiness in his own home and the homes of his children."

"Interviewed on Windermere station"

There were five children, three sons and two daughters. The elder daughter Beatrice, married the mathematician E. T. Copson in 1931. Copson had been appointed to a lectureship at Edinburgh University in 1922. He often recalled [9] that he was interviewed by ETW on the platform of Windermere station and offered the post on

the return rail journey. In 1930 he moved to a post at the University of St Andrews, where he occupied the Regius Chair of Mathematics from 1950 to 1969.

One son, Eddy, became an actuary - rising through that profession to become Vice-President of the Prudential Insurance Company of Newark, New Jersey. Eddy was responsible for devising a medical insurance scheme which covered 80 million Americans.

Another son John Macnaghten (Jack) Whittaker became an eminent mathematician in his own right. Jack was also awarded a Smith's Prize by Cambridge University, was elected to the Royal Society in 1949 and was Vice-Chancellor of Sheffield University from 1953 to 1965. Jack had a warm relationship with his father; they were both teetotal and shared an interest in gardening. They corresponded every week, and those letters are now in the archives of the University of Toronto. The letters reproduced here came from his estate to Alan Hill, a Sheffield bookdealer.

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