

A. Yibert Douglas

Memoirs

"Pilgrims Were We All" ^{79.} TS
Chapters 10 to 12

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Box 3

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CAMBRIDGE 1921-23

After seeing the Quest depart, we returned to Cambridge to prepare for the autumn term. This meant finding other lodgings since our happy summer arrangements could not last for the house on Chesterton Road belonged to St. John's College and their students would be occupying its rooms. We moved to a house on The Causeway owned by a middle-aged bachelor who was quite a character. He liked to talk about "my poor old Father" who evidently died from imbibing too much alcohol over the years in which he was active in the horse racing world and, according to the son, at times a close pal of King Edward VII. Once during the Newmarket races The King "came waltzing up our garden path" to have liquid refreshment with his companions. A proud possession of our landlord was the armchair in which King Edward had sat and we were each invited to sit in it! His housekeeper looked after us and the other lodger, Dr. Combie, an Australian and his wife. He was an able astronomer, a statistition who in later years became head of the Nautical Almanac Office.

Work in the Cavendish was resumed and I thought I was making some progress so I attended the lectures for research students on scientific German, a prerequisite for a Ph.D. whether at Cambridge or McGill. Two bits of advice from the fine old Professor (anyone around 60 was labelled 'old' by the under thirties!) have remained with me and have been passed on many times: learn all the little words, prepositions and conjunctions; and make full use of 'judicious guessing'. At that time and for several more years, no woman could hold a Cambridge degree although she could acquire all the academic and resident requirements. As the months passed and I became more aware of my own limitations and more doubtful that I would ever make myself into a research physicist, I determined to forget the Cambridge Ph. D. and take full advantage of the rich offerings for widening ones horizon of interest which Cambridge afforded. This decision crystallized slowly after an interview with Sir Geoffrey Butler, the scholarly Fellow of Corpus Christi College who was official advisor to postgraduate students. He was the College Librarian and on a subsequent occasion he showed me many of the treasures of their library, amongst which I recall the Journal of Richard Coeur de Lion describing his campaign in Palestine, portions of which were translated and sent to General Allenby. Vividly in our minds at that time was Allenby's victorious entry into Jerusalem in 1917, having dismounted in order to enter the Holy City on foot.

Sir Arthur Quiller-Couch was the King Edward VII Professor of English Literature and in accordance with the terms of this professorship, he gave a series of public lectures each winter. I attended the series on Dickens and also that on the Brontes. Sir Arthur was a determined anti-feminist, openly disapproving of The University policy of admitting women to academic courses. His public lectures were attended by many wives and daughters of dons, by many women students and by a minority of young men. Sir Arthur always entered the lecture hall slowly, carrying a pile of books most of which he placed on the chair and sat on them. Then after looking over his audience he solemnly began his lecture with the word: Gentlemen. He had a most mobile, sensitive face, on which was mirrored in advance the emotion about to be expressed, of pathos or of a coming humorous remark. I remember him describing the grim environment of Dickens' early years, one lasting effect of which, he said, was the pathetic fact that his favourite flower was the red geranium. The following spring I was paddling my Aunt up towards Granchester and as I overtook a punt in which he was sitting amidships, the young man who was punting managed to get his pole tightly fixed in the muddy bottom, lost his balance and fell into the river with a mighty splash to the uproarious delight of other punters nearby.

The Slade Professor of Fine Art gave a series of evening lectures on French Gothic Cathedrals. One simile has often come to mind, The Miracle of those inspired early builders who "tossed up stone like spray."

Sir William Ridgeway gave several lectures on Archaeological subjects. On one evening the subject was The Age of the Pyramids and Stonehenge. He derided the astronomical dating of the former by Piazzzi Smith and the latter by Sir Norman Lockyer. Stonehenge, he claimed, was much less old than Lockyer had calculated. A hot argument with another archaeologist ensued, but Ridgeway was a most formidable opponent, both by physical stature and self-confident vehemence and he appeared to have the last word. I was sorry about this for I had considerable faith in Lockyer's line of reasoning on astronomical grounds. Years later when the radioactive carbon method of dating things was applied, I was gratified to see Lockyer's estimate vindicated.

One day a Newnham don invited me to go to the stately dining hall of St. John's College to hear Walter de la Mare who was addressing the Fellows and Members and a few friends on some College Anniversary. He elaborated on the fact that no two people can possibly react in exactly the same way to any event or idea, whether spoken or read, because each individual by the uniqueness of his life

long accumulation of experiences has developed his own interior environment against which every new experience or idea will impinge. The associations which every idea or observation evoke will differ to some extent with every individual.

The very able radiologist at the Addenbrook Hospital was Dr. F. Shillington Scales. He was a distant cousin of the Halls of Montreal and the Shillingtons of Belfast, so my Aunts and I were frequently invited to their home. Mrs. Scales was as gentle as he was outspokenly blunt and assertive, yet beneath his obvious male superiority was a very kind heart toward anyone in real trouble. Like Quiller-Couch he deplored the presence of women in the academic life of the University and neither of his two talented daughters was encouraged to enter Newnham or Girton. The first time I was at tea in their house he sat beside me on a sofa, inquired what I was doing and then proceeded to impress upon me that no woman had ever excelled in science or literature -- who were the great writers, poets, artists, composers? All men. Even in the field of the domestic arts, the great cooks and fashion designers were men. There was so much general truth in all this that I said I could only agree, but in the case of science he must make an exception, namely Mme Curie. Looking at me with the utmost scorn he replied "Mme Curie - the wife of a clever chemist." I was indignant and pointed out her continued leadership, her prominence in Solway and other Conferences, consulted and respected by the small group of atomic physicists of the day long after her husband's early death. Months later when a General Election was called, four or five University men were nominated as candidates for the University seat (since abolished by a Labour Government). I was again at tea in the Scales' drawing room and I asked Dr. Scales who in his opinion would be chosen. I mentioned Sir --- ---? "Oh he is a silly ass." Professor --- ---? "Another silly ass." Last I mentioned Sir Geoffrey Butler. With scornful disgust Dr. Scales replied "Oh, no, he is a feminist." Sir Geoffrey was openly in favour of equal opportunities for the women students. He was not chosen by the conservative (small c) University electorate, and one of the "silly asses" was. Doris Scales and her sister invited me to a tennis party one Saturday afternoon. One of the young men was C. G. Darwin, grandson of Charles Darwin and son of Sir George. Both father and son were mathematical physicists. C. G. was associated with the Cavendish. After tea at the Scales he amused and mystified the group with his Elusive Loop trick. Many of the young people tried it and failed. I watched his hand very carefully and then took the long loop of cord and did it correctly much to my satisfaction after my obviously inept exhibition on the tennis court.

I first met C. G. Darwin at dinner at the Rutherfords, and also Ralph H. Fowler who had just become engaged to the Rutherford's daughter, Eileen. The young men were all enthusiastic rock climbers

and the conversation seems, in retrospect, to have been largely about that. The entrance to the Rutherford's house was right at the road. A long passage connected this door to the house set well back in large grounds with some lovely old trees. On the wall of this passage was a reproduction of that section of the Bayeux tapestry portraying William of Normandy on one side of the channel, and King Harold on the other side, both gazing at the representation of Halley's Comet (1066) with contrasting emotions. Near this hung the well known splendid portrait of Sir Ernest (as he then was). He opened the door for me and pausing before this large portrait, he drew my attention to it with a most disarming boyish glee. No false modesty inhibited Rutherford, he thoroughly enjoyed the fame his achievements had brought him.

He was a gifted lecturer whether in a public lecture or to Tripos students in an introduction to radioactivity which I attended. His mastery of his subject and enthusiasm for it held ones attention and his lecture room demonstrations were excellent. I heard Sir Joseph Thomson give two or three undergraduate lectures on his "plum pudding" atom. A contrast to Rutherford's ebullient delivery, J.J. was quietly restrained but somehow magnetic. His eyes slowly traversed the entire lecture theatre and at some moment in every lecture you felt that he was looking directly at you and speaking to you personally.

Professor Eddington (his Knighthood came about ten years later) was, by another contrast, the most impersonal lecturer imaginable. When the following winter I signed on for his course in relativity I would see him week after week enter the classroom where about eight senior students were sitting, proceed to the blackboard, then turning 90° towards the side wall he would put into words the significance of the equations and their components. It was like a soliloquy. He acted as though unaware that we were in the room. If as occasionally happened one of the men asked a question, Eddington would look at him and politely answer or briefly explain.

Meetings of the Cavendish Society were always interesting. Rutherford was a general chairman. In discussion after the address he was incisive and on occasion aggressively critical. When Niels Bohr was the lecturer, Rutherford was at his most amiable. But when the American physicist Langmuir addressed the Society on his static atom Rutherford became truculantly indignant. I shall never forget his explosive "Mr. Langmuir, you are degrading physics to the level of descriptive botany."

Eddington was invited to expound his theory of electron capture in stars which led to a value for the opacity that differed from that found in laboratory discharge tubes. The discussion was lively for the physicists were critical, maintaining that the opacity factor should not differ in the stellar gasses from that found

in the laboratory. Finally Rutherford, like a mighty giant, lusting for battle entered the fray to deliver the final crushing blow. But Eddington's rapier met Rutherford's broadsword and neither gave an inch. The ultimate resolution of the dispute ten years later, when new knowledge of the hydrogen content of the stars has come to light, harmonized the matter. Both men were Titans but how different!

Sir Joseph Larmor, a relatively old man at that time, often attended Cavendish Society meetings. Aston had just succeeded in establishing fractional values for the atomic weights of various isotopes and presented these results at one of the meetings. His work was warmly applauded but at the close of the discussion Sir Joseph Larmor rose and sadly regretted the need to abandon the beautiful simplicity of the whole number sequence of atomic weight. Listening to him I could almost imagine there were tears in his eyes. This was typical of the contrasting reactions of the young and the old to the drastic changes which new knowledge inevitably brings. When I think today of the simple picture in the twenties of proton and electron and a little later the neutron, and compare it with the bewildering situation forty years later with mesons, muons, pions, indeed scores of subatomic 'particles', I find myself feeling a deep sympathy for Sir Joseph's lament.

Rutherford liked to take distinguished visitors around the laboratory, always pointing out the nationality of each of the research workers, for he was proud to have attracted men from all over the Commonwealth and from other countries. I remember one day he brought Sir James Dewar, another time the second Lord Rayleigh whose father had held the Cavendish professorship before J. J. Thomson. Lord Rayleigh gave two lectures, one on aurora so rarely seen within the latitudes of England, and one on the colours of thin films, interference of light in oil films and in the successive layers of calcium in shells. He also told of capturing some fire flies, putting them in a small container in front of the slit of a spectrograph and obtaining the spectrum of their light, most intense in the visible range of wave lengths and lacking in the infrared or heat range, an efficient distribution of energy which no artificial source of light has been able to achieve.

In October of that 1921 autumn, Aunt Mary became critically ill from an internal stoppage of natural functions. The physician advised against any attempt to operate and prescribed heavy sedatives. In the early morning of October 19, her brave spirit left the frail body. She had fought a good fight and had entered into light. Her ashes are buried in our lot in the Mount Royal Cemetery in Montreal. About a month later George received this news when the Quest reached Rio de Janeiro, and his heart was very sad for he loved and admired her greatly.

This was a cold winter in Cambridge. Ice formed over the shallow parts of the Cam, on ponds and pools and in the water jugs in our bedrooms. Aunt Mina got the flu badly and I got it less severely. The forthcoming Christmas vacation beckoned us to somewhere warm and sunny. In the window of the Tourist Bureau on the Market Square I saw a pamphlet about Majorca, the sunny island in the Mediteranean. Having taken it home, our decision was soon made. We did not pause long in Paris but took the day train to Toulouse where we stayed over the week end. In the transept of the Cathedral housewives deposited their baskets, filled in the busy Sunday morning market outside. They stayed for a portion of the Mass, then returned to take their baskets and go forth into the bustling market square again. Towards evening we went to a large very asymmetrical church where the walls were hung with great tapestries only displayed at Christmas and Easter times. The next day we spent at Carcassonne, that marvellously fortified double-walled medieval city from whose southern ramparts we had our first view of the Pyranees. Here in Carcassonne both history and legend are woven around the name of that 11th century Spanish Knight of fortune, the Cid.

Eastward toward our first glimpse of the Mediterranean, we passed Narbonne and the large areas of enclosed sea water for salt evaporation, then turned south to a thorough customs inspection at Cerbère, the French border town at this eastern shoulder of the Pyranees; then a short tunnel emerging on the Spanish side of the height of land at the railway platform of Port Bou where soldiers guarded the station and everyone had to leave the train again with all baggage for an even more thorough customs examination. One American lady in our coach was very indignant because she was subjected to a search of her person for secreted money. Through fine scenery at length to Barcelona, an old city where we stayed two nights. We enjoyed the cross-section of Spanish life encountered on the broad Rambla, the panoramic view from the restaurant terrace high on Tibadabo, the close built environs of Cathedral and harbour. Then we had one night on the small steamer which as the sun rose was rounding the beautiful south western coast of Majorca to enter the splendid harbour of Palma whose golden sandstone Cathedral and Castle dominated the little city, glowing with the reflected rays of the early morning sun.

Palma Cathedral is impressive early Spanish gothic. A strange feature is the open coffin of the mummified body of King Jaime high up in the wall of the apse, with a conveniently placed ladder so that the inquisitive visitor may climb up and view the dead Monarch. I went up and was somewhat shocked to see a white woollen cape about his shoulders into which tufts of black cotton thread were tied to simulate ermine. Our hotel ran a "Soucoursal" bacross the bay under the shadow of the imposing old Castle. We moved there on Christmas eve. Breakfast of coffee, marvellous light flaky croissants and honey was served on the bedroom balcony overlooking the beautiful bay, the harbour

and the city golden in the morning light. Peace reigned supreme except on those mornings when live pigs, squealing horribly were loaded aboard ships for the Barcelona market, where we were told, they commanded high prices because they had been turned loose in the fig orchards to enrich their flavour by devouring the ripe fallen figs.

Fellow guests at this hotel were a retired Englishman and his wife. He was associated with a famous firm of locksmiths whose name he bore. One morning he asked my Aunt if she had any money in the Merchants' Bank of Montreal, where indeed all her income was deposited. In his Financial Times he had read of its failure, but assured us that the Bank of Montreal had stepped in to take all responsibility so that depositors lost nothing.

We went by bus up the island to Deja, Valdemosa and Soller. I have vivid pictures in my mind of the Carthusian Monastery where Chopin and Georges Sand spent a winter; of the gorge down which we drove one day after a night of terrific wind and rain with every window rattling and the feeling that our little hotel would be hurled down into the valley; of walks up through ancient olive trees on the mountain slope at Deya and through an orange orchard when the ground was strewn with ripe luscious fruit of which the pickers told us we could take all we could carry away; of the Soller market so full of colour where we first tasted pomegranates; and of Miramar and Mirador with the lovely little Greek temple on the coast of grey rocky cliffs and sturdy pines.

Returning to our hotel overlooking the city and Bay of Palma, I determined to have a swim in the Mediterranean and so on New Years Day, 1922, cautioned by the proprietor not to venture far out in case of sharks, I swam a little way close along by the grey rocks and then climbed ashore again. My next swim in the Mediterranean was to be with George and Olga Crichton in the Bay of Naples, but that was eighteen months later.

Back in Cambridge the cold raw winter weather continued and people skated on the frozen pools on Jesus Green. A young lecturer, E. A. Milne, gave a course on Radiation Theory which I attended. The irony of it was that the Trinity College lecture room where we met was icy cold in spite of a small fire at the far end beside which was the lecturer's desk. Young men with their academic gowns worn over their great coats and with thick wool mufflers around their necks occupied the two front rows. Cecelia Payne of Newnham College and I sat behind them and no radiation reached us. I had to keep my feet moving up and down and take notes with woollen gloves on my hands and I must admit not much Radiation Theory penetrated my skull.

About this time a new face appeared among us at the Cavendish. This was a young Russian physicist, by name Kapitza. Rutherford set him the same problem on which I was making but little progress, the heating effect of some rapidly disintegrating radioactive product. None but the very best electrical equipment would satisfy Kapitza and I can see him following on the heels of a disgruntled Chadwick pestering him in high and even higher shrill tones to get some piece of apparatus. In a few months Kapitza had solved the problem by a method very different from the one Rutherford had suggested to me. It was soon quite evident that in Kapitza he had a remarkably capable and original investigator, a man to whom even Rutherford gave his unstinted admiration and full support. A few months later when Kapitza was producing incredibly high electric fields for a hundredth of a second in which interval he caused expansion and ionization and photographic exposure, Dr. A. S. Eve of McGill visited the Rutherfords and being shown Kapitza's laboratory he remarked that one hundredth of a second was a very brief time, to which Kapitza replied that one hundredth of a second was a long time if you knew how to use it!

When I finally realized that I was on the road to nowhere, that neither my heart nor my abilities were in nuclear physics, I had already been going out to the Observatory on Saturday mornings for several weeks, where Professor Eddington was giving a course in Practical Astronomy and the Chief Assistant, Dr. W.M. Smart demonstrated the adjustments and use of the telescopes. Pure curiosity had led me to enroll in this course, but as time went on I became more and more attracted, not to instrumental errors and positional astronomy but to astrophysics, the interpretation of stellar spectra. I spent far more hours in the University Library pouring over elementary books on astronomy and astrophysics than my work at the Cavendish could tolerate. At length I sought an interview with Professor Eddington, explained my position and enquired whether there was any problem in his field in which I might engage. My nervous lack of self assurance and his intense reserve made this and subsequent meetings solemn affairs but his unfailing courtesy, his sympathetic understanding and complete mastery of the subject and the mathematical tools with which to cope with its problems never ceased to impress me. He suggested a statistical study of the relation between stellar velocity and absolute magnitude of a certain large group of stars. An American astronomer had made such a study and had come up with an anomaly for which Eddington's deep insight perceived the cause. My study was to indicate the source of the anomaly as inherent in the very nature of spectroscopic absolute magnitudes. At that time I had no idea what the term spectroscopic absolute magnitude implied or how the true brightness of a star could be obtained from it's spectrum. Curiosity about this led me to the original papers and four years later to my Ph.D. thesis. My debt of gratitude is great to Eddington and very especially to W. M. Smart who initiated me into the use of the star catalogues and to the charts which provided the angles required to free the proper motions of the selected stars from the solar motion. A. S. Eddington became a revered acquaintance, W. M. Smart a life-long friend.

That spring brought a stirring of interest in a movement within the Anglican Church, called The Modern Churchman's Movement. Bishop E. W. Barnes of Birmingham and other leaders both clerical and lay were seeking a realistic, straight forward statement of belief in the light of modern science, discarding literal interpretations of what they felt to be myths and symbolic expressions of Christian beliefs. When they held a Conference in Girton College we attended several of their sessions. This was my first experience of cycling with a trailer-bath chair in tow, hard work but so worth while when we could both hear these thoughtful speakers and enjoy little expeditions together.

As spring moved into summer letters came from Cape Town bringing the news of Rowetts cancellation of the further exploration in the Antarctic and plans for the return voyage which should bring the Quest to England sometime in September. With the close of the Cambridge session in sight, we decided to take advantage of favourable rates of exchange and see as much as we could of Western Europe. Armed with maps and Baedakers we crossed the Channel to Ostend and went on to Bruges for a few days in that lovely little town with it's canals, towers, carillons and art treasures. In Brussels we stayed long enough to learn to find our way about that great city with it's marvellous old City Hall and flower market with stately buildings on all sides, St. Severin's Cathedral, The Palace of Justice and the great Terveren Park and Congo Museum. Our train from Brussels took us into Germany at Aix-la-Chapelle and so to Cologne where our limited knowledge of German was augmented by diligent study of a phrase book. We rather expected to find some sullen resentment amongst these defeated people, but actually we met with nothing but courtesy and often kindness. Frequently in restaurants a waiter speaking excellent English would be directed to our table. Asked where he learned his good English, the reply would be "Before the war I was a waiter in London -- best years of my life, wish I could go back." But unemployment in Great Britain was still a tragic problem and they knew this was so. In Cologne we went to the Opera House where Carmen was performed, interested to see whole families listening with rapt attention, both old and young. In the intermission they brought out newspaper wrapped hunks of dark bread and thick slices of sausages which they consumed with gusto. In Bonn we made our way to the house where Beethoven was born and to the University where we watched a senior laboratory technician perform great feats of glass blowing. Appreciative of our admiration of his skill, he blew a little glass vase which he presented to us. In a small steamer we sailed up the Rhine as far as Koenigswinter where we went up to the famous view point, immortalized by Byron: "The castled crag of Drachenfels / Frowns o'er the wide and winding Rhine / whose breast of waters broadly swells / Between the banks which bear the vine." And what a view of that rich countryside and busy river highway, with it's many barges being towed up or down! The next morning we continued up the river which winds its way through that hilly country passing vinyards, villages, towns and old castles picturesquely guarding strategic hill tops. Coblenz rises impressively on the

right bank of the river, but of chief interest are the imposing 400 ft. basaltic columns of the Lurlei. Here the river narrows and winds, hidden reefs produce rapids and hazardous navigation and the legend of the siren nymph whose singing lured sailors onto the submerged ledge of rock in midstream has evoked German music, verse and art.

We left the steamer at Bingen, once a Roman outpost, and next day took the train to Nurenburg where we lingered in that ancient town, not then associated as in tragic later years with the hated name of Hitler. An American business man whom we had met on the train saw us one day and urged our going on without delay to Munich and thence to Oberammergau. We did leave that very day for Munich but had no desire to see the religious pageant, as we then thought of it. What I remember best of the days in Munich is the Alte Pinakotek with its splendid Rubens collection; and vividly recall having tea in a little park when our American friend happened to stroll by and seeing us came over to our table, sat down and asked if we had our tickets booked for Oberammergau. When we reiterated our lack of interest, he earnestly advised us not to miss it so persuasively that we went to the agent and booked our tickets. How glad we were afterwards - a great and movingly religious experience, beautifully staged, acted and sung with solemn reverence.

We went to see one of mad King Ludwig's castles and then over the pass into Austria and down to Innsbruck. One day we went up to the snowline, kicked away a fringe of snow and found small flowers beginning to bud forth. Off to Salzburg where the music Festival being in full swing, we could find no room anywhere so we sat up all night in a hotel lobby. In all my subsequent travels with no room booked in advance, I never had to experience this bit of bad luck again although forty-three years later in Czechoslovakia I came within an ace of it. We went to the Monastery where Mozarts' spinet was shown us and the Monk invited my Aunt to play a few chords; then up to the Citadel for lunch, then the train to Gmunden where the daughter of the local pastor found us a nice room over a café. One boat tour of the long lake, the Traunsee, and off we went to that little gem of a lake high up in the mountains, Achensee; and then on to Linz where we slept on the Danube steamer and sailed down the great river all the next day. Spectacular Durnstein fortress dominates a narrow turn in the river. It is one of three Austrian castles with which the Blondel and Richard Coeur de Lion legend is associated. At one small town a dozen or more Tyrolean singers in their traditional Tyrolean costumes were given a great send-off as they came aboard. In spite of some drizzle they sang almost continuously on the upper

deck until we put in at another town where a similar group of men were awaiting them. The two groups lined up on the road by the wharf facing one another two deep. After the song of welcome from the local choir, our men sang a response and as our steamer pulled away we saw them break ranks and embrace, then walk away in jovial informal groups.

Towards sunset we docked at Vienna, where we found comfortable lodgings a short walk from The Ringstrasse, and settled down for about two weeks. This was a sad time for Austria and especially for Vienna. A great city formerly life-centre of a vast empire, was now bereft of Czechoslovakia, southern Poland, Hungary, Yugoslavia. It was a metropolis in a small country, mostly mountains and with almost no industry, surrounded by bitterly resentful neighbours unwilling to allow enough food over their borders until Great Britain intervened. The currency was falling precipitously during our weeks in Austria. If my memory is correct a roll of bread worth 80 kronen when we entered the country was over 500 kronen when we crossed into Italy. The suffering was intense and, of course, it hit the elderly on pensions and fixed incomes the hardest. We felt guilty as our pound sterling rose and rose in value but Austria so needed the tourist money that everywhere we were welcomed. Four times I have returned to Vienna always leaving with regret and a deeper love.

En route southward to the Italian Tyrol, we stopped over in the high mountain health resort of Semmering. A long walk in a lovely valley brought two rewards: wild pink cyclamen growing by the footpath and a view of the second of the three Durnstein castles to lay claim to the finding of Coeur de Lion by Blondel. Thence into the wide valley of the Drave, gay with the red berries of countless rowan trees. Villach and Lienz held us briefly. In Toblach we saw one of the few remaining Round churches built by the Crusaders. Here we entered Italy and in the glorious mountains of Tirol, the Dolomites, we came to Cortina. One day we walked a long way to Monte Piane and scrambled up to its summit where earthworks and barbed wire still spoke of the recent battles with the Austrians just across the valley on the slopes of the Drei Zinnen. Here I picked up the rusty tin helmet which is now at Ashkirk, grim evidence of a fallen soldier of the Italian Alpini regiment; and on the grassy slopes we found several patches of Edelweiss. Moving up to a charming small hotel at Tre Croce, we took many walks in the woods and open spaces with Monte Cristallo, Piz Popena and Cristallino towering around us. Returning towards sunset on one walk, a mist rose from the Ampezzo valley and we saw the phenomenon of the Brocken spectre. We walked to Lake Misurina and stayed in the hotel there over Aunt Mina's birthday, August 26th, when I hired a skiff and rowed her around the little lake. Returning to Cortina we took the great

bus trip up and down through the Dolomites to Bozen, with the peaks of Schlern and Rosengarten rising to the east. Bozen was now Bolzano and here as in Cortina, the people all spoke German. The recent transition from Austrian to Italian sovereignty was proving a difficult readjustment for the inhabitants of all this Dolomite country.

We took the train over the Brenner Pass to Innsbruck and thence into Switzerland. Wesen and Lausanne briefly but we stayed several wonderful days in Grindelwald and then in Lucerne. I think it was in Lucerne that we received the letters from Lisbon that told us the Quest should soon be arriving in Plymouth. We lost no time in returning to England and went straight to Plymouth. Next morning at breakfast we were told the Quest had come in the night and dropped anchor out in the harbour. We went down to the docks and could see her about half a mile out. We were unable to hire a boat to take us out but were told to sit in a motor launch that was going out in about an hour. There we waited and at length down came a Rolls Royce with Mr. Rowett and a companion. Rowett conferred with the skipper of the launch and evidently told him to evict us, which he very apologetically did, saying that only Mr. Rowett and his secretary were to go out to welcome the expedition home. We were both disappointed and indignant but there was nothing for it but to wait hours on the dock until the Quest came slowly in to her berth and George came ashore. What a reunion that was.

George arranged for the transportation of his ton of geological specimens to the British Museum of Natural History. We waved, so to speak, to the statue of Drake overlooking the harbour, saw the historic bowling green and the aquarium and took the train to London. Here he arranged with Dr. Campbell Smith at the Museum for space to work on his samples at intervals while spending most of his time on his Report at the Scott Polar Institute in Cambridge. Thus we were able to live together for the next nine months, a wonderfully happy time for all three of us. I had set a precedent for Chesterton Road in the spring by crossing the footbridge to the Midsummer Common side of the Cam before breakfast each morning for a brief swim, having first ascertained at the Police Station that there was no bylaw to prevent it. As the hot weather continued through September George and I enjoyed our early swim every morning until the Michelmas term being about to begin, we found a small house to let furnished where we lived in comfort until June 1923.

In the Polar Institute and Geology Department George found — congenial people. R. E. Priestly and James Wordie of St. John's College and Frank Debenham of Emmanuel were Antarctic veterans.

The latter introduced him to Dr. Peter Giles, Master of Emmanuel, who made him an honorary Fellow of the College, thus giving him some experience of high table collegiate life and contacts with men in other colleges. Work on his report progressed steadily and necessitated frequent visits to London where he was given Honorary Membership in the Royal Societies' Club on St. James Street, where I think he stayed during these spells of work at the Museum. The Wegener Hypothesis of Drifting Continents was the great new topic of controversy amongst the geologists and opinion was divided leading to animated debates. George was caught up in it all and drew me in too. He had quick insight into a point that needed clarification and we wrote a short paper on it together which appeared in the Geological Magazine in March under the title "Note on the Interpretation of the Wegener Frequency Curve."

Among his samples George had several dredgings of deep sea pelagic deposits and he also had a reprint of a paper by Dr. Sven Odén of Sweden outlining a method of determining the distribution of sizes of fine particles by continuous weighing during sedimentation. He suggested that I carry out these measurements on his samples. Rutherford accepted my abandonment of the experiment I had been working on for so many months, and gave me a large empty room on the top floor in which to work. George helped me to set up the equipment and this with the statistical study of stellar velocities kept me busy all winter. Towards spring I had worked through all the samples of deposits and wrote up the results. I was anxious to consult with Dr. B. A. Kean, the head of the soil analysis section of the agricultural research institute at St. Albans, so George and I went there on our bicycles, an all day expedition. We were cordially received by Dr. Kean who was slowly progressing with an electromagnetic method of measuring the rate of sedimentation, a method which, when perfected, would undoubtedly give superior results to ours. He was very interested in our more approximate results by so straight forward a method as George had suggested and we had a most interesting hour or two with him. I showed the paper to Rutherford saying the proceedings of The Royal Society of Edinburgh was the suitable place to publish it because of a somewhat similar study made in 1891 by Sir John Murray and Dr. Sven Odén on the deep sea deposits obtained on the H.M.S. Challenger expedition (1873-76). Sir Ernest at once offered to communicate with the paper as he was a Fellow of the R. S. of Edinburgh, and it was published in their Proceedings No. 16, 1922-23.

One vivid memory of that winter is of a dark wet, windy winter evening when Sir Oliver Lodge was to address a meeting with Rutherford presiding. George and I set out on our bicycles for the engineering building on the other side of the town, but my oil lamp kept blowing out in the gusting head wind necessitating many stops to strike match after match in order to get it alight again. However we got to the packed hall just as Rutherford began

a glowing tribute to Sir Oliver who had early realized that Clerk Maxwell's famous equation could be thought to imply the existence of electromagnetic waves longer than the infrared heat radiations, and that these longer waves could prove of great value for long distance communication. Lodge carried out many imaginative attempts to produce these waves and urged physicists everywhere to do likewise, and it was just one of the chances of Fate, said Rutherford, that it was young Hertz in Germany and not Lodge in England who succeeded first in producing radio or Hertzian waves. Sir Oliver was a distinguished and impressive figure. His address was interesting but not memorable. He paid tribute to Rutherford whose first research as a young New Zealand scholar at the Cavendish under Sir Joseph Thomson had been the successful transmission of radio waves through several thick walls and eventually from the Cavendish to the Observatory in 1896. Marconi about this time was able to achieve distances greater than this, approximately a mile and a half, by transmitting from the top of a high mast. The following day Sir Oliver spoke of his spiritualistic beliefs and experiences from the pulpit of a little old church between the market square and King's Parade, an impressive vindication of his deep involvement in these phenomena.

On Sundays we usually went to one or other of the College Chapels or to the Round Church, one of the few remaining Crusaders' churches in England, or to Great St. Mary's where the University Sermons were preached. One series of three sermons on the Reformation I well remember. Luther, reformation by revolution; Melancthon, reformation with moderation; Erasmus, reformation by restatement. These opened new horizons for me and I looked with a new interest at the windows of the rooms occupied by Erasmus in Queen's College never dreaming that one day I should find myself working morning and afternoon in those very rooms. Twice we went to the Methodist Chapel to hear the distinguished classical scholar and a leading nonconformist layman, Dr. T. R. Glover, Fellow of St. John's College and a former Professor of Latin in Canada at Queen's University, but his inability to refrain from facetiousness in the pulpit was a serious weakness and detracted greatly from his effectiveness.

Unforgettable are the evening services in the stately candlelit chapel of King's College where the voices of the choristers rise and fall in lovely harmony, soaring to the fan vaulting of lofty roof.

The year 1922 brought the Centenary celebrations of The Royal Astronomical Society, two years late because of disruptions of the post-war period. These celebrations included a *Conversazione* in the rooms of The Royal Society in Burlington House to which Professor Eddington, then President of the R.A.S., invited his

two women students, Cecilia Payne and myself. We both went up to London for this event. Just to be in the Royal Society rooms was itself a thrill, and especially to wander through it's Library and Museum where Newton's little pioneer reflecting telescope was on view.

On George's frequent visits to London he often saw Denham Verschoyle. This led to an invitation for George and me to visit the Verschoyles at Christmas time in their home, Tanrago, Ballysodare, Co. Sligo. Our good family friends in Belfast, Bertha and Courtenay Shillington had already invited all three of us to spend the Christmas vacation with them at Glenmachan Towers. What a happy, anxiety-free time that was. But Bertha Shillington was very averse to my accompanying George to Sligo, for the "troubles" were not completely over and reports of the Black and Tans deparadations in the West were still appearing in the Ulster Press. In spite of this, off we went by train to Enniskillen where we had time to go up the hill to the monument to the famous Irish Fusiliers regiment, the 27th, before catching our train to Sligo. We arrived at Ballysodare Station that dark, rainy winter evening to find the Verchoyle's coachman awaiting us. How cold and raw it was! As we approached the Ballysodare bridge, we were stopped by an Irish soldier with a thick green muffler around his neck above his greatcoat. He inquired who we were, where we were going and why, then examined our passports and motioned the driver onwards. The bridge had been partially blown up recently and a wooden section had been erected. Great trees near the road had been felled across it but were now cleared to the sides. Some of the "stately homes" had been burnt to the ground. We learned later from the Verschoyle's neighbours, that one night a band of men pounded on their door and gentle Mr. Crichton had gone down and invited them in, gave them the run of the large kitchen where the aga stove was alight and tea available. They left early in the morning without having disturbed the family upstairs in any way.

At Tanrago we were greeted by Mr. and Mrs. Verschoyle, their two young sons and little daughter, the mother-in-law and grand Aunt Minnie. Next day they had arranged with the neighbours who had a donkey and side car that the daughter, Olga Crichton, should take Aunt Minnie, George and me along the coast to Tubber Patrick where the rocks were interesting and many-coloured sea anemones were brilliant in the pools. I was somewhat overawed by Olga, a striking looking young woman of about my own age, larger than I and far more self-assured. I was relieved that George, who had never seemed at ease with girls, quite naturally mounted the side car beside Olga, while Aunt Minnie and I sat on the opposite side. We had a picnic lunch at Tubber and Olga seemed proficient at the fire which she and George made in a depression in the rocks.

He made no move to change places with me on the return drive, rather to my relief. That evening we met Olga's parents as the two families assembled to see George's excellent slides of the Antarctic ice, the glaciers of South Georgia, the penguins, etc. The following day we walked by the oyster beds, and then rowed a heavy boat with very heavy oars across Ballysodare Bay to the shore under knocknarea, where we went to Aunt Minnie's house, Glen Lodge, from which we climbed a long way up the remarkable glen which is a narrow deep cleft in the mountain side. We returned for tea and a chat by the fire, joined by a young man, a neighbour, who suddenly turned to me and said "What is the theory of relativity?" Before I could open my mouth, Denham exploded, "Nonsense, absolute nonsense, and much of Newton's theory of gravitation is wrong too." I began to protest and as George used to say afterwards, the fat was in the fire as Denham and I argued. George and the young man retired to the garden! That afternoon we walked up to the Crofton's for tea, and the next day we returned to Belfast, changing trains at Omah with enough time there to sit on a hillside for our sandwich lunch.

Olga was enrolled at the London School of Education working for the diploma in rural child and adult education, so that when George was in London for work at the Museum they would plan to meet. Once when practise teaching brought her to Cambridge she came to lunch with us but Aunt Mina and I had no idea they were becoming deeply attached to one another. We were, therefore, completely taken by surprise when on the evening of the Oxford-Cambridge Boat Race George came back to Cambridge very late and very excited, gave us each a pair of kid gloves and announced his engagement to Olga Crichton. He had taken her to see the early morning race and by the side of the Thames she had agreed to become his wife. Aunt Mina was not very happy about it, for George had no settled future other than a year or two as a Pl.D. student - assistant with Professor Daly at Harvard. On the other hand Mrs. Crichton was strongly in favour of marriage as soon as possible. Later that spring when she was in London for a few days, we went there to see her.

As the third term went on we both progressed well with our work. The St. John's College Fellow, G. Udney Yule, distinguished statistics author and teacher, coached me through his text book on applied statistics, I being the only person to have applied for the course he offered. He had resided in India at some earlier time and his rooms in St. John's contained many beautiful and interesting treasures. He had a fund of stories but so enjoyed the humour of them that he would become incoherent with half choked laughter so that I never really heard the end of the tale.

My work with Eddington yielded results which brought both proper motion and radial velocity conclusions into harmony, as Eddington had anticipated, and he wrote up our findings for presentation at a spring meeting of the Royal Astronomical Society in Burlington House. Aunt Mina and I went up to London for the meeting. Eddington was in the chair and as there was a long list of papers, he let ours be read only by title.

We went again to Burlington House to a meeting of the Geological Society when George addressed the Fellows on some geological observations and results arising from the Quest expedition. Both Denham Verscholye and Olga were also present and we were all very proud of the main speaker. In Cambridge our social life widened. We could entertain in a quiet way in our little house and invitations for all three of us came from time to time. All George's and my friends loved Aunt Mina as soon as they met her for her gentle charm, intelligence and kindness won their affection. The Master of Emmanuel and Mrs. Giles were warmly hospitable, as were Dr. and Mrs. Shillington Scales and Jack Wordie. Lady Thomson invited us to tea one Sunday in the Master's Lodge of Trinity. Here George and Sir Joseph became deeply engrossed in the question of artificial diamonds. Referring to the French scientist who claimed to have made them in his laboratory, J. J. said with vehemence that he did not believe it. Lady Thomson gently but very firmly said "Joe, Joe, remember he is dead." George was invited to the high table of, I think, St. John's for a great banquet to celebrate something. It was quite an occasion and old traditions were punctiliously observed, including the bringing in towards the end of the dinner of a silver basin of water and a towel. George saw this brought to the Master who dipped a corner of the towel in the water and then wiped behind each ear. The basin was then brought to each guest in turn for similar ablution. When it came to George, he too followed the Master's example and applied a little cold water behind each ear, a treatment which would be very salutary for anyone who had been imbibing unwisely.

One Sunday we decided to cycle to Ely, taking Aunt Mina in the trailer chair attached to George's bicycle. They got far ahead of me, but when I hoped George was pausing to wait for me it was only to wave his arm vigorously to urge me on. Breathless I completed those fourteen miles and reached the great west door of the Minster to find them anxiously at the entrance with the verger who was about to close the door. I had not known, as George obviously had, that no one could enter during the service and we were only just in time. Another day we cycled to Newmarket, a round trip of about thirty miles. Pushing our cycles and trailer through the crowd on the Heath we found a good vantage point a bit up track from the finish line. The races were in progress. In one of them the King's horse was competing and when it came in first, the excitement and joy in the crowd were quite extraordinary.

in the great race of the day I think we saw Steve Donoghue, afterwards winner of the Golden Spurs of Epsom for three Derby victories, but I cannot be quite sure of this. I know we saw Donoghue win a race sometime, but just when it was I have forgotten. I have seen the Derby run three times and I know from his Autobiography that Steve Donoghue won it six times in all.

A happy episode in my tenuous connection with Newnham College was the water sports early one morning in the late spring. Teams of three were to compete in the canoe races, while as individuals we competed in the swimming and the hurry scurry races. Cecelia Payne and a friend of hers knew I was quite a powerful paddler for while I had both my Aunt and Mrs. Smart in my canoe I had beaten them paddling together in their canoe as we returned upstream from the spring bumping races a week or two earlier. So we three formed one team. I took my canoe up above the Mill Pool lock the previous evening and hid it in the bull rushes near the stretch of the river where our meet would take place about 6 A.M. the next morning. The early hour being chosen so that we should have no riverbank spectators nor the hindrance of other boats on the river. I slept that night in the College as guest of the Domestic Bursar who gave me her couch. When about a score of us assembled soon after 5 A.M. they realized that no porter was on hand at that hour to let us out, so we climbed over the garden wall somehow or other, and walked up the tow-path. A rather feeble series of races followed. My canoe had no real opposition in the paddling race, and I won my swimming race and the hurry-scurry far too easily, but it was all lots of fun with some comic upsets and much laughter.

About this time Dr. and Mrs. F. D. Adams were in London where George saw them and showed his former Professor of Geology and Dean of Science his rocks from the expedition on view in the Natural History Museum. He told Dr. Adams that he had brought back a King Penguin to present to McGill University and showed him the carcass. Dr. Adams offered to take it to Montreal with his own baggage and get a taxidermist to cure the skin professionally and stuff and mount it. So George sewed it up neatly in canvas and off it went with the Adams' things. When their steamer docked in Montreal the Customs Official was examining their quite considerable luggage and asked what was in the canvas package.

Mrs. Adams replied, "a corpse." This excited the curiosity of the Official so he was told about the young Canadian who had been with Shackleton to the Antarctic, etc. etc., and all this so interested him that he passed all their trunks and suitcases without further inspection. On our return to Montreal that autumn, Mrs. Adams told us this story with great enjoyment. The penguin is beautifully mounted in the Museum, smaller than the Emperor Penguin, but proudly displaying the orange feathers around it's neck, a touch of colour which I believe no other type of penguin possesses. The name of it's donor is recorded on the stand.

George's reports were nearing completion and I was winding up my work as the summer of 1923 began. He had seen nothing of Europe except the battlefields, Paris, Dover and Boulogne so Aunt Mina and I proposed a trip to Switzerland and Italy before we returned to Canada. He naturally wanted to see all he could of Olga so it was decided that she should come too. We crossed the Channel to Le Havre and went to Paris for a few days, then on to Lausanne where we called upon an Uncle of Olga's and his family in a Town nearby where, I think, he had a school. An all night train took us through the Simplon and then down by the lovely lakes and to Milan. Finding no accommodation there we saw only the great Cathedral and then proceeded by train to Genoa where we all had lunch with a much loved Uncle of Olga's and his Italian wife who made their home there. Uncle Henry produced champagne to honour his niece's engagement, the first champagne I had ever tasted though it was only months later that George discovered that I did not know what I had been drinking in Genoa and this remained a little joke between us. In all truth I consider champagne a much over rated wine.

Needless to say, we loved Florence and Fiesole overlooking the beautiful valley of the Arno. Churches and palaces, immortal sculpture and the rich treasures in the Uffizi and Pitti Galleries, all made an indelible impression on our minds. I remember how impressed I was at George's immediate recognition of many of the great paintings made familiar to him from his perusal of the album of post card reproductions sent to us by Aunt Mary in 1910. This album I still have and kept it open beside me a few years ago as I read Irving Stone's Life of Michelangelo. George had a very real appreciation of art, both classical and French impressionist. Years later he wrote to me of a fine Luini in the Louvre, near Mona Lisa - this I found and greatly liked when in Paris in 1952 - and on another occasion of the head of a negro by Rubens in the Art Gallery of Antwerp - and this I saw in 1954, a very striking work of art.

We spent several days in Rome visiting its great monuments both sacred and secular. One day we turned down a narrow side street and saw that crowds were gathered along the great broad street to which it led. We were just in time to see Mussolini on horseback at the head of a procession of his followers, those immediately behind him were also mounted and then rank on rank of men. The crowds were giving the

SUMMER 1923 to AUTUMN 1926.

While on the "Quest" George had been greatly impressed by a veteran sailor, Thomas McLeod, who worshipped Shackleton with whom he had sailed on the ill-fated "Endeavour". He was one of the party who wintered on Elephant Island while Shackleton, Worsley and three others sailed and rowed the 800 miles to South Georgia to obtain a rescue ship. McLeod never seemed idle on the "Quest", always finding some spar to sand down and varnish or other useful job. He said that his sailing days were over and he wanted to emigrate to Canada. George offered to pay his passage to Canada if he would work for us at the island for a moderate monthly wage and he told him of the life there, the boats, the wood, ice, grass and sundry chores with daily trips for milk and supplies when needed. McLeod agreed and after a short time at Ashkirk, George left us for his summers work with the B.C. Geological survey.

All went well for the first month. McLeod made friends in Gananoque and fascinated them with his tales of Antarctic adventure. But he soon became discontented, wanted more money, wanted to stop work sharp at 5 P.M. and do nothing on Sundays, not even put ice in the refrigerator. He grew surly and rude and refused to be dismissed. So we had to write to George who sent a letter dismissing him. How surprised McLeod was when our good friend, Dr. F. E. Wright, the Finley's son-in-law, read him George's letter, handed him his wages and a return ticket to Montreal and told him to pack his bags. An hour later Dr. Wright took him to Gananoque. McLeod did not return to Montreal but remained in Gananoque where he spread tales of our unjust treatment of him. Eventually he was employed by a farmer-fisherman on Howe Island at the mouth of Big Bay, and evidently found working for and with men more satisfactory. He remained there until his death fifteen or twenty years later when a small paragraph in the local newspaper referred to this veteran of Antarctic voyages. We were all disappointed that what had begun as a mutually happy arrangement should have turned out so badly.

George came back from B. C. in September. We had a happy week at Ashkirk, closed up and returned to Montreal. But soon he had to leave us again to begin the first of two busy, happy years at Harvard as part-time Assistant to Professor R. A. Daly, head of the Geology Department. He registered in the Ph.D course and chose to work on the spectroscopic identification of minute quantities of elements in various minerals and other rocks. This brought him in touch with Professor F. A. Saunders, head of Physics, who encouraged and helped him in every way, putting an excellent spectrograph and dark-room facilities at his disposal. Reginald and Mrs. Daly, Margaret and Andy Saunders became life-long friends. Both Daly and Saunders were Canadians by birth and education, the latter a younger brother of the founder of the Dominion Experimental Farm who developed the quick ripening marquis wheat adapted to

to cultivation in the more northern parts of Canada and likewise an apple tree suited to those regions of short, bright summers.

I resumed my position as a Demonstrator in Physics at McGill and was also given the task of lecturing to the Pharmacy students and the women in first year Physical Education, both of which groups were required to take one course in elementary physics which consisted of a smattering of mechanics, heat, light, sound, magnetism and electricity. I enjoyed giving these courses for several years after which some basic changes in the training programs for these technical diplomas led to the dropping of these courses. In addition to lecturing, I had three two-hour laboratory periods for arts, engineering and medical students. There were always two other Demonstrators in these large classes and we shared the slave-work of marking the weekly lab. reports. I had registered in the Pl.D. course but had no idea upon what type of problem to embark. Eddington had suggested my continuing the work we had done in Cambridge, applying it to another component of stellar motion, but it led me nowhere. I began an observational study of cloud chamber patterns which led to a short paper which Dr. Eve presented for me at the spring of 1924 meetings of the Royal Society of Canada in Quebec. It was published in their Proceedings and when I visited George at Harvard and showed a reprint to F. A. Saunders, his comment was: A quite respectable burial!

Before Christmas 1923, George and Olga had decided to be married in February, when Harvard classes were suspended for the mid-term break and so George would be free to go to Ireland for the wedding and a short honeymoon. As Aunt Mina and I could not go, she suggested to George that our great friend, Bertha Shillington, be invited to represent us. Bertha, Mrs. Courtney Shillington of Glenmachan Tower, Belfast, had known the Douglas family from her girlhood when she and her brother Alex Hall, parentless, had become members of the family of the Rev. and Mrs. Wm. Hall, life-long friends of our family. So George asked that "Aunt" Bertha be invited. After some unexplained delay, this was done and she was the guest of the Verschoyles at Tanrago, winning the hearts of everyone by her warm charm and graciousness.

On February 21st, 1924, in the Beltra Church of Ireland, George and Olga were married. Denham Verschoyle was best man and Violet Crichton was Olga's matron-of-honour. Olga wore a very becoming afternoon dress of mid-blue silk which became her best dress when she came to the New World. After a few days in Achill Island, they sailed for Boston and settled into the little top floor flat in Cambridge which George had been occupying. This was the first of their eleven happy homes in five countries during their thirty-four and a half years together.

As soon as possible George brought Olga to us in Montreal where her fine presence and out-going personality evoked a warm response from all our friends. At a reception for George and his bride at Bessie Hall's, one of the young daughters of Dr. Fred Finley said to a friend. She is a Greek goddess! That Easter we visited them and rejoiced to see how well they were getting on and what an interesting and varied circle of friends they had. We met the Dalys and Saunders. Mrs. Daly was a Southerner who was married straight out of a southern home of many servants. She told us of her tribulations as a young servantless housewife and how her beloved Reginald - always three distinct, long drawn out syllables - had to teach her the rudiments of the domestic arts, even to the drawing and dressing of a chicken when she had never before had an uncooked bird in her hands and was in tears when faced with one for the first time. In her slow soft southern speech she described the inadequacy of her young husband's early efforts at lecturing and how she kept saying to him, "Reg-i-nald, you must put it across," always accompanied by a slow gesture, "put it across, put it across." And Professor R. A. Daly became one of the finest and most effective lecturers on the Harvard campus.

The back window of their flat overlooked the playground of a school for small children. Olga's training as a teacher led her to visit this school one morning. She met the Principal and found her to be a splendid woman of great inovative vision and dedication to education. A lasting and valued friendship was made, but with one of the teachers, Anne Thorp,, a grand-daughter of Longfellow, Olga formed one of those rare friendships when kindred spirits meet in a relationship of mutual esteem and understanding which grows deeper with the years. To George too, and to each of their children, Anne Thorp became a greatly loved and trusted friend.

Alfred North Whitehead and Mrs. Whitehead had come to live in Cambridge when he was appointed Professor of Philosophy at Harvard. He retired from his professorship at the University of London in 1924 at the age of 63 and began his amazing productive twenty and more years of writing and teaching at Harvard. Lucien Price refers to him as "one of the towering figures in 20th century philosophy and also one of its most beloved personalities." George and Olga were taken by a friend to one of the Whitehead's weekly open house gatherings where students and others dropped in to listen to or participate in conversations which might range from philosophy to any facet of human interest. They, too, fell under the spell of the charm, the gentle goodness and the intellectual greatness of this amazing man and his wife, his perfect helpmate through their long married life. From this first contact a warm and treasured friendship developed. Over a year

later when little Elizabeth was at the active crawling stage the Whitehead's came to tea with George and Olga one Sunday afternoon. George loved to recall how white haired, rosy cheeked "Alfie" got down on his knees and raced the baby across the carpet, afterwards as though apologetic for his behaviour he remarked "As one gets older, one tends to become either pompous or childish - I prefer to grow childish."

George wrote to me that we should invite Dr. Whitehead to address the McGill Physical Society, so my chief, Dr. A. S. Eve, wrote to him but no reply came; then he telegraphed an invitation, but still no reply. So I asked George to find out what was wrong. Alfie replied simply that he never answered letters or telegrams because to do so would consume too much time that he wanted to use in other ways. So George arranged with them that he would buy the tickets, put them on the night train, that I would meet them in Montreal, bring them to our home where they would be our guests for three days. All this took place and became a happy experience both for us and for them. He chose as the title of his address to the Physical Society ~~The~~ Ether of Events, because as he smilingly explained "Ether will draw the physicists and events will attract the philosophers." Of his address I can only remember one quite unforgettable sentence: "An electron does what it does because it is what it is." The following afternoon McGill physicists and philosophers met them at our home. Both their sons, North and Eric, had served in the Second War, and their daughter Jessie in the Foreign Office. The death of Eric, the aviator, opened an unhealable wound in his parents' hearts. Mrs. Whitehead told us with bitter resentment of the inhuman red tape of the War Office. She and Alfie were temporarily back in Cambridge when news came that their son was seriously wounded. She hurried up to London to find out the latest news of him, only to be told that her husband was listed as next-of-kin and only to him might a report be given. "But I am his Mother." No, only to his father. "Is he alive or dead?" No report could be made save to the father. So she had to return to Cambridge to await the dreaded telegram.

Their daughter, Jessie, came out from England to visit her parents and wished to stay longer than her entrance permit allowed, so they asked if she might come to us in Montreal until a re-entry visa could be obtained. Thus we had a short, happy visit from her. When the Royal Society of Canada celebrated its 50th Anniversary in Ottawa, Dr. Whitehead came as representative of the British Academy. We saw him briefly on this occasion and not again, but what a marvellous personality he had, leaving an indelible memory of gentle greatness of mind and spirit. Like Thomas Hardy's Ancient Spirit of the Years in The Dynasts, he seemed to hover above the world of time and space, viewing the history of mankind, the developments of man's thinking down the centuries and grasping the significance of it all with extraordinary clarity and mellow wisdom. Read again Science and the Modern World and Religion in the Making to confirm this.

At McGill I was elected Secretary-Treasurer of the Montreal Centre of the Royal Astronomical Society of Canada, a position I held until I left McGill for Queen's University in 1939. This entailed planning the program of meetings and in the course of time we brought to Montreal many members of the staff of the Dominion Observatory, the Chief Meteorologist from Toronto, Dr. Annie J. Cannon, D.Sc. (Oxford), that loveable and distinguished woman whose eyes had classified several hundred thousand stellar spectra at Harvard. Frequently the McGill Physical Society had a speaker on an astronomical or allied subject and then I arranged an invitation to RASC members to attend. Thus we heard such famous scientists as Silberstein, LeMaitre, de Sitter, E.W. Brown, Bertrand Russell, J.S. Plaskett. Often we had to rely on local speakers. Professor A.H.S. Gillson was a willing and able lecturer, and I myself addressed the RASC eight times and the Physical Society seven times and twice the Chemical Society. One of these was entitled The Chemistry of the Stars, after which my chief, Dr. A.S. Eve said to me "If you were a man I would say that was a damn fine lecture, you took them by storm," a comment that was so encouraging I have never forgotten it. After my first address to the Physical Society, Dr. Eve gave me some sound advice, "Throw your voice up and over to the last man in the back of the hall" to which I add Aunt Mina's advice "Never begin to speak on a high note but in the middle or low range of your voice," and from my own experience, after forty-one years of teaching and more of giving addresses to many kinds of audiences: "Never begin with an apology. Prepare a good opening sentence and a good concluding sentence and get to the latter within the allotted time."

In the summer of 1924 Olga stayed with Aunt Mina and me at Ashkirk while George took a survey party up north of Lake Huron. When the British Association met in Toronto in August we went there for the meetings. Amongst the celebrities were Rutherford, Eddington, Sir Wm. Bragg and his son W.L. Bragg ("Little Willie" later Sir Lawrence to succeed Rutherford as Cavendish Professor), Dr. St. John of Mount Wilson, LeMaitre (as yet a graduate scholar), Henry Norris Russell of Princeton, Alfred Fowler from London and R. H. Fowler from Cambridge, E.W. Brown, Van Biesbroeck, Sydney Chapman, C.D. Perrine, to name only some of those in the physical sciences. Dr. C.A. Chant organized an astronomical Luncheon at which 39 astronomers were present. This was for me a memorable occasion as also was the afternoon reception given by Sir. Robt. Falconer for the Mathematical Congress which met at the same time as the B.A. The Geological Dept. of the University of Toronto organized a visit to the Niagara gorge and the Falls. We went on this trip where our old friends Dr. A.P. Coleman F.R.S. and a colleague explained the geological features. This was our first visit to Niagara and a grand event but it meant that we lost most of the "Citizen's Lecture" in Convocation Hall on Relativity by Eddington. By taking a taxi

at the harbour on return from Niagara we just managed to hear his last ten minutes.

After the meetings Olga went to join George and had her first experience of camping. The coming of September brought them both back to Ashkirk and then briefly in Montreal before their return to Cambridge, Mass.

During the 1924 winter Dr. Ludwig Silberstein, Research scientist at the Eastman Kodak Co., Rochester, N.Y., with his doctorate in mathematics from the University of Rome, came to McGill to expound his modification of Einstein's Cosmology. It was my task to write the report of that lecture for the next morning's copy of the McGill News. Dr. Silberstein was so pleased with that report that he asked me to add a sentence or two and send it to the Editor of Science, in which widely read Journal it appeared in April, 1924, under the title "Determination of the Curvature Invariant of Spacetime." It brought some publicity to Silberstein which he greatly appreciated and a warm correspondence friendship developed which gave me both pleasure and encouragement. A deduction which I made from his cosmology entitled Real and Apparent Radial Velocities was published that spring in Monthly Notices of the Royal Astronomical Society, London, with the blessing of Prof. Eddington in spite of the fact that he did not accept Silberstein's assumptions. The next winter, 1924--25 Silberstein visited McGill again and he urged me to go for the summer as Volunteer Research Assistant to Yerkes Observatory in Wisconsin. By that time Olga was expecting her first baby in July. George knew he would have to be away up north of Lake Winnipeg that summer, so it was arranged that Olga and Aunt Mina would go over to Dublin to Olga's brother Brian to await the birth. I, thanks to Silberstein's introduction, was accepted by Dr. E.B. Frost, Director of Yerkes Observatory for a four month stay at the Observatory, mid-May to mid-September.

George and Olga had chosen the names Patrick or Elizabeth for their first-born and on July 22, 1925, Elizabeth came into the world. George only read the Dublin cable several days later when he had paddled miles and miles down the Berens River to a postal settlement. He brought the paddle which he had used so vigorously back to Ashkirk in mid-September and gave it to me, a beaver tail blade which is at the cottage now. I received the news from Dr. Frost to whose office the cable had been telephoned. We were both amused by the bit of extra information in the cable, "fair hair two eyes" which we construed as "Blue eyes". Elizabeth was an active, vigorous baby, literally a bouncing baby, a joy and delight to us all and to all who knew her, throughout her forty-two years of life.

> Dr. Frost was very kind and helpful in every possible way. When I said I should like to find criteria for spectroscopic absolute magnitudes of Class A stars, he placed the whole collection of

1-prism spectrograms at my disposal. He was a good astrophysicist but although failing sight had brought him almost to complete blindness, he continued to be an able director of this famous observatory which was the astronomy department of the University of Chicago, and he was Editor of the prestigious Astrophysical Journal. Other members of the staff were also gracious and helpful, initiating me into the use of the 72-inch refractor, the various measuring machines and the blink photometer; Dr. Van Biesbroeck, F. E. Ross, Otto Struve, and Oliver Justin Lee who encouraged his wife and me to swing out onto the metal ladder that took one to the top of the great dome which commanded a fine view of Lake Geneva and the surrounding country. We were the first women to do this. Other research students like myself were Bobrovnikof (a white Russian refugee like Struve) Justin from the Case School, Eckhart who became a distinguished computer scientist with I.B.M. and his friend from Oberlin. The Yerkes Observatory stands on a high moraine on the shore of Lake Geneva, a long beautiful lake at the farther end of which is the town of Geneva. Eckhart had just learned to swim a slow breast stroke but he was determined to add his name to the list of observatory staff who had swum across the lake from the observatory wharf, about a mile or perhaps a little more. His friend was to row alongside and they invited me to join the swim. We started about 4 P.M. on a lovely warm, almost windless day. I am no speed swimmer but I kept getting so far ahead of Eckhart that I would have to float, tread water, roll over and splash about to keep warm in order to let him and the rowboat catch up. Over an hour went by and I decided to strike out for the dock in front of one of the many lakeside cottages and await them there. In due time they arrived, took me aboard and we were rowed back to our own dock. I was so late getting to my boarding house for supper that it's owner, Mrs. Sawyer, had become worried and phoned to Dr. Frost who knew of our plan to make the swim. When later that evening I returned to the Observatory, as was my usual custom, I overheard Dr. Frost in the corridor anxiously inquiring whether anyone had seen Eckhart and me. I went to my door and reassured him that we had completed the crossing in what was probably a record for slowness, and returned safely!

The previous winter I had written a popular article on the possibility of other inhabited planets in the Universe, entitled Other Little Ships which I had posted off to the Atlantic Monthly. It's Editor, Ellery Sedgwick accepted it and when the August Atlantic reached its subscribers at Yerkes Observatory with my article in it there was considerable surprise and not a little amusement because the Editor's footnote showed that he thought the author was a man. Four more articles were accepted in the next seventeen years and when he retired as Editor in 1938 I almost felt that I had lost a friend. His autobiography, The Happy Profession, is a delight to read. He discovered my sex one summer when on return from England he landed in Montreal and took the opportunity to go up to McGill University where he asked to see me. The janitor

at the Physics Building told him I was away and that A. V. D. was a woman. I have always regretted that I never met him. I do not remember that he ever altered a word of my essays, but I did resent his refusal to print the Latin Dulce et decorum est pro veritate laborari, substituting an insipid English translation.

On my return to Montreal in mid-September, having obtained the material which I hoped would result in a doctoral thesis, George soon joined me and we went together to Quebec to meet the ship bringing Aunt Mina, Olga and little Elizabeth. What a moment that was for George, entering the cabin to see his little daughter for the first time. Later on when we were all in the cabin the Purser appeared at the door with the announcement that "This ship cannot leave Quebec until the doctor has seen the little Irish emigrant," so in came the M.D., took one glance into the crib, and smilingly withdrew. George moved in with Olga and Aunt Mina and I were given a cabin. It was a happy trip under the great Quebec bridge that evening and up river to Montreal next morning; and a happy few days in our home before the proud parents took their baby to the little flat in Cambridge.

George and I both worked hard that year, adding scientific German in heavy doses in preparation for the required examinations. Mine in French and German were successfully passed by mid-December, the final date if the degree was to be conferred in May. I continued to lecture in a physics course and inaugurated a course in astronomy and astrophysics which was optional for third and fourth year honours students and I continued to demonstrate in the first year science and medical laboratory two-hour periods. The Yerkes data fulfilled their purpose and provided the relationships which made possible the determination of absolute magnitudes and parallaxes of 200 Class A stars. I had one long talk with Dr. J. S. Plaskett, Director of the Dominion Astrophysical Observatory at Victoria, B.C. when he visited McGill, and I went down to Harvard in the early spring to consult Dr. Harlow Shapley. This was a doubly satisfying trip as I stayed with George and Olga as well as seeing that famous Observatory for the first time and meeting not only it's genial Director but also Dr. Annie J. Cannon and her vast catalogue of stellar spectra, Leon Campbell of variable star fame, the Canadian graduate student Peter Milman and my old Newnham College friend, Cecelia Payne. No one at McGill was really interested in my chosen field. Professor Gillson had been an Isaac Newton Scholar at the observatory in Cambridge but his field was mathematics, not stellar spectroscopy. When my oral took place, I was completely unprepared for Dr. Eve's sadistic but quite unsuccessful insistence on grilling me about long forgotten derivations of elementary physics formula. But as I knew Herbert Dingle's and F. G. M. Stratton's books from cover to cover I was completely on top of the world with all Gillson's questions and so was given permission to proceed towards the degree. My thesis began with an Introduction written with a view to submitting it as

an article to Discovery where it soon appeared as "The Riddle of Star Distances." The resulting cheque more than covered the expense of producing the required three copies of the thesis. The outside examiners were E. B. Frost of Yerkes Observatory and W. E. Harper of Victoria, B.C. The Ph.D was conferred at the 1926 Spring Convocation and George and Olga and little "Buzzy" came to us for the occasion.

At this time George had established the high sensitivity of his spectroscopic analysis. A man in Boston had died under somewhat obscure conditions. The hospital physician suspected lead poisoning but the laboratory tests were inconclusive. An intern brought a tooth of the victim to George, who crushed it very fine, placed a little of the powder in the arc and out came the "raies ultime" of lead so strongly that no doubt could remain as to an abnormal lead content in the body. In a few months George could have written his thesis and completed all the minor requirements for the Harvard doctorate, but it was not to be. A letter had come from Sir Auckland Geddes, Chairman of the Rio Tinto Company, London, offering him the position of Chief Geologist if he could come immediately. Professor Daly's reaction was "Go! a degree is a stepping stone to a job. If the job comes first, take it." So, having stored the contents of their flat, they sailed to England that spring of 1926 and after a brief visit to Carrowgarry and a short stay in London, they proceeded by train through France and Spain to Sevilla and thence to the Mining Community of Rio Tinto. A new chapter had begun.

RIO TINTO, LONDON and NORTHERN RHODESIA

1926 - 1932

When George and Olga arrived in Rio Tinto a bungalow was assigned to them on the longer of the two rows of company houses for the English engineers and office personnel. This house was built around a little paved court and everything was whitewashed. Behind the row ran the road lined on its far side with tall eucalyptus trees. Along this road passed peasants with laden donkeys, often the man astride the load while the wife plodded along behind, usually with a load upon her back. Some were peddlers of brassware or lace and embroidery, some with citrus fruits and vegetables. Each morning came the milkman with his goats, stopping if hailed by a little Spanish maid into whose pitcher he would milk a goat on the spot.

In about fifteen minutes one could walk to the Spanish town where the miners lived and where a few shops were clustered including a dairy where Olga bought clean goats milk. There was no T. B. testing of cows, so many of the foreigners thought it safer to use the goat milk. To the little square of the town came the bus from Sevilla and from this square it departed every day for the fifty or so mile drive southeast through the Sierra Morena. A railway line ran down the Rio Tinto valley to the busy port of Huelva, some forty miles to the south where the ore was loaded into the holds of the vessels at the long company wharves.

George was at once captivated by the complexity of the ore-bodies in this famous region where several types of deposit existed side by side. From one hillside the ore could be leached out into long holding tanks in the valley into which chunks of iron were thrown and gradually the copper in the water replaced the iron. From huge terraced open-casts ore could be mined and sent to the smelters whose tall smoke stacks rose starkly above treeless hill tops. Yet another ore body was so enriched with gold and silver that it was shipped directly from Huelva to the Netherlands where the extraction process separated out the different constituents. Both George and Olga soon learned enough Spanish to enable them to converse at least in a limited way with the workers around them. Most of the little maids who did the housework for the English families spoke a little English.

Early that first autumn Olga was expecting her second child. Would it be Patrick or Mary? If a boy he would be registered as a Spanish citizen if born in Spain, and whether a girl or a boy a Spanish birthplace might complicate the matter of visas, etc., in future years. (some years ago I was greatly concerned about a scholarly English woman who accepted a post at Harvard but was denied an entry to the U.S.A., being told that she must wait her turn to be admitted on the Indian quota because she had been born in India where her English Mother was living for a few years while the Admiral father was in charge of the Indian Ocean Fleet of the Royal Navy. Almost unbelievable, but true.) So in October Olga and George journeyed to England whence George returned at once to Rio Tinto and Olga crossed over to Dublin to Brian's home. Here Mary was born on November 2nd, 1926.

Before very long the bungalow at Rio Tinto housed Father, Mother, Toddler, Baby and an energetic, devoted young English Nanny. George put in a request for one of the larger houses on the row facing the tennis court at the far corner of which stood the spacious Manager's House. A vacancy did not occur until the following mid-summer when they were able to move to the more commodious quarters.

All winter George mapped the geological features, studied the structure and theorized over the intrusions, especially an elaborate stockwork on the rock face of one of the opencast terraces. Was this the pathway up which had welled the ore-rich molten liquid which accounted for the vast deposits? If so, should there not be another deposit below the bank of a little stream which ran down a fold in the hills not far away? Winter ran into spring and George and Olga wrote urging Aunt Mina and me to come over and visit them in the summer.

We were both anxious to see the little family in Rio Tinto and also something more of Spain so we began planning at once and my old bank book for March, 1927, shows a withdrawal of \$260 marked "Passages French Line". When my McGill work was completed at the end of May, we very soon went to New York and embarked for Vigo on La Bourdonais of the Compagnie General Transatlantique. This was a delightful passage. We had a small deck cabin on this one-class ship and I still remember with pleasure the bottles of red and white wine placed on our table for four every lunch and dinner. Early one morning we steamed out of a coastal fog, barely missing a small fishing craft on our starboard, and into the sunshine of the long lovely ria far on the south shore of which lies the picturesque town of Vigo. We stayed two days exploring the markets and little streets. We went to the fish auction hall where every buyer had an electric bell connection on his desk. The fisherman displayed his catch, the auctioneer named a high price and lowered it little by little until some buyer pressed his bell. Thus the fisherman got the best price possible for the night's labours.

George had told us not to miss seeing Santiago de Compostella with its great Cathedral dedicated to the Apostle James, a shrine for thousands of pilgrims, especially at festivals when the great censer suspended from the vault of the nave between the transepts is lowered and caused to swing from one transept in a long arc up into the other. We went on to Corunna, thinking of General Sir John Moore buried there in 1809 when, in the dead of night, "Not a drum was heard As his corpse to the ramparts was carried." I had not Aunt Mina's sense of history, but I think she too found it a disappointing visit. We took the night train to Madrid. Two memories of our three days in that great city are dominant: the Prado with its powerful Goyas, its Velasques and its Murillos, especially his paintings of little street urchins; and the Royal Palace where King Alphonso was in residence and the palace guard were performing a stiff goose-step drill in the forecourt.

We had one memorable day in Toledo, that ancient little walled City high above the Tagus, "dominated by its wide double aisled Cathedral and immortalized by El Greco. Then south to Cordoba, where we first encountered the rich heritage of Moorish learning and architecture - the lovely mosque so ruthlessly desecrated by the conquerors, Isabella and Ferdinand. Looking into the holiest prayer alcove, the Mirhab, with its exquisite honeycomb vaulting, I realized the universality of the human need for prayer, whether to Allah or Ra, to Brahma, to the Great White Spirit or to Jehova and I thought of the Psalmists words, "O thou who hearest prayer, unto Thee shall all flesh come". Thence to Sevilla where George met us and took us by car to Rio Tinto. Olga with two-year-old Elizabeth by the hand and Nanny with Mary in her arms came out to greet us.

As the bungalow had no spare room, Olga had arranged with a neighbour to let us sleep in her two-storey house. Our hostess was a native of Cornwall who boasted that she had the evil eye. We took good care not to impose upon her hospitality and were indeed grateful to her and her engineer husband. Every morning we were awakened by the young Spanish maids singing haunting but illusive little songs as they did the washing beneath our window which overlooked the courtyard, the road and the eucalyptus trees. Seeing the various aspects of the mine with George was a revelation to me, and listening to his theories and problems was a privilege, reminiscent of the old McGill days when he always claimed that my questions made out of complete ignorance, helped him to clarify his own thinking. He was mulling over the problems associated with drilling, just where to set up the rig and at what angle to bore and at about what depth they might expect to enter the mineralized zone which he felt confident must lie below. Drilling began and anxious days followed as core after core was brought up and placed in the long rows of wooden grooves. Then one happy day a core showed mineralization and the next length and the next. A new ore body was indeed revealed and everyone was jubilant.

The Rio Tinto Company owned a strip of the long sandy beach west of the mouth of the Rio Tinto and had built a series of smaller and larger wooden bungalows, all set up on stilts four or five feet above the sand in case of exceptionally high spring tides. In the summer these were occupied by the families of the staff people. George and Olga were able to get a three-bedroom cottage which with its living room and little kitchen gave ample accommodation for us all. Everything was of the simplest. To escape the heat of July and August, the whole family went down to Huelva in the coach car attached to the ore train, were ferried across a deep inlet of the sea and walked through the little village of Punta Arenas to the beach cottages. George came down for week ends until his holiday began. The swimming was a joy and the sand was fine and clean. Small translucent shells and sturdier scollop shells abounded. A colorful annual festival took place soon after our arrival. The statue of the Madonna was carried out of the village church in procession with chanting.

It passed through the village down to the water where it was put in a boat and given a little tour of the sea front before being solemnly returned to her pedestal in the church. This was the ritual Blessing of the Waters, after which the mothers would permit their smaller children to go in bathing.

Aunt Mina and I went up to Sevilla for a few days to see the Moorish Alcazar; the great Cathedral with its high double aisles, its huge mural of St. Christopher on the west wall of the south transept and its bell tower; the smaller churches with their works of art; the cork market and so much else in that lovely city. Then Aunt Mina took the bus back to Huelva and I took the bus to Rio Tinto for it was July 11th when George and I liked to be together on the anniversary of our Father's death in far off Denver, twenty-three long years before.

One week end we went to Huelva and down the east shore of the estuary to La Rabida, the Franciscan Monastery where Columbus stayed the last night before setting sail to discover the New World. His three little ships Santa Maria, Pinta and Nina lay at anchor that August night in 1492 in the Rio Tinto just above the convent, and here he dropped anchor again in March 1493 on his triumphant return.

Leaving the children with Nanny and Aunt Mina, Olga and I set off for Granada. From the valley of the Guadalquivir the train slowly made its way eastward. At Sevilla large numbers of soldiers had come on. They were on leave from the war in Algeria and full of high spirits. At every stop some got off to be almost smothered in the embraces of semi-hysterical mothers and then greeted by stoical fathers and noisy younger relatives. The heat was almost intolerable and I got very indignant with an army officer who planted himself in front of our open window while he stared and stared at Olga. Twice he returned to block our air in spite of my reiterating "Mucho calor" and motioning him away from the window. At length he left us in peace as we traversed the long Vega to the hill city of Granada crowned by the Alhambra. Here we stayed three or four days, marvelling at the intricate beauty of Moorish art and architecture. We stood in the great hall where Ferdinand and Isabella accepted the surrender of the last Moorish Commander and a year later welcomed Columbus on his return from the New World. Washington Irving's Conquest of Granada made the historic scenes come alive. In a second-hand shop in the city I bought the beautifully wrought iron broiler-toasting fork which hangs by my fireplace as I write these words. In a large pottery works in the foothills of the Sierra Nevada, Olga bought all the bowls and dishes which she could carry home to Rio Tinto.

Soon after our return to Punta, George and Aunt Mina set off together to Granada. A few days later came a card telling us that they were going south to the spectacular old town of Ronda and then on such a day to Algecires and then Gibraltar. This seemed an

opportunity which might never recur, so I packed a small bag and went to Sevilla for one night. I remember spending that evening in the Hotel Inglaterra writing the beginning of what became a year later my second article in the Atlantic, "The Energy of Starlight". Very early next morning I took the bus to Jerez where there was just time for coffee and a roll before the departure of the bus for Algecires. The road ran through forests of cork oak, up the spiral road to the little hill top city of Medina Sidonia whose ruler in 1588 was the Admiral in command of the Spanish Armada, on and on until suddenly across the water there was the crouching lion -- the great Rock of Gibraltar. When I boarded the ferry that forenoon I fully expected to find George and Aunt Mina but they did not turn up and I assumed they had been delayed and would cross on the evening ferry. So on arrival in Gibraltar I set out to find rooms for us for that night. This accomplished I walked around the base of the Rock to Catalan Bay where I waded in the Mediterranean and then sat in the shadow of the Rock to read. The beach was deserted save for one coast guard who came over to warn me not to go swimming because the flag on the pole at his station indicated that sharks had been sighted. Returning to the town I got some tea and then went down to the pier to await the ferry. A heavy sea was running, the wind was rising to a howling gale and rain began to fall. The ferry was not expected for an hour, then another hour. Darkness fell and the rain pelted down. People hoping to return to Algecires crowded into the waiting room. At last word came that no ferry would come until next day. People streamed out of the waiting room and I suddenly came face to face with George and Aunt Mina looking utterly tired and exhausted. Amazement came upon all three faces. Where had I come from! Where had they been all day! They had come a day early to Algecires, had spent the night there and crossed the bay on the very early morning ferry and they had been touring the Rock fortifications on the go all day long. When I said I had rooms for us at a nice hotel near the harbour, the relief on George's face I can still see. We were a happy trio in the hotel that night. Next morning they took me where they had been the previous day. The storm had died down, and we returned that afternoon to Algecires and continued homeward to Punta.

When the time came for our return to Vigo and La Bourdonnais George and Olga accompanied us to Lisbon for two days of sightseeing after which they returned to Punta and very soon moved back to the mines. A visit from Professor Gratton of Harvard gave George great satisfaction. To take an experienced economic geologist all over the mines and discuss its problems with him was very stimulating. It was there in Rio Tinto that Gratton amused Elizabeth and Mary with the story of the engine pulling a heavy train up a hill - I think I can, I think I can About this time George acquired an assistant to help with the mapping, a young Spanish geologist, Rosa da Luma. He charmed Olga with his piano playing and in particular with a lovely little composition which he wrote out in notes so that Olga could learn to play its very tricky opening bar.

Two years and more went by and then George was told to return to London where he set up an office, with a draftsman - typist, in a large bare room on or near St. Swithen's Lane, just a few minutes walk from the Head Office of the Rio Tinto Company near the Mansion House. He bought a house in Holmbury St. Mary, that lovely part of Surrey between Dorking and Guildford, a short bicycle ride south of the little railway station at Gomshall. This was a large house set in a hillside garden of rhododendron and azalias, a tulip tree and others. It looked across the road to the grey parish church and the deeply wooded hill on the other side of the little valley. Up the hill behind their house stretched the common land where ardent amateur archaeologists were digging out the site of what they thought had been a Roman encampment.

Olga had a wonderful time visiting second hand furniture stores in Guildford and Dorking to furnish the two sitting rooms, dining room and four bedrooms, while George commuted five days a week between Gomshall and Cannon St. Station. But before they were really settled in their new home, Sir Auckland asked George to go to Northern Rhodesia to look over the copper prospects there. Olga invited her Aunt Beatrice and Uncle (a dentist on Wimpole Street) to stay with her. George sailed to Cape Town where his brother-in-law, Dr. Eric Crichton, and his wife made him welcome before he took the train for the long journey northward. At N'Kana he found his former McGill professor, Bancroft and his wife, who insisted that he stay with them. Here he bought his first motorcar, had one driving lesson from the garage owner, and then drove off to the Bancroft house to invite Mrs. Bancroft to go for a drive with him! He took her all over the town and next day set off for his own destination, N'Changa. Here the possibilities of the area seemed to be very great and he returned to London to put in a strong recommendation in favour of developing the area.

The Company were also interested in a property in Norway, north of the circle, and sent George to look it over. He took Olga with him and while he went inland to examine the area, she stayed at the coastal town, walked up a hillside and picked wild strawberries in October. George was not enthusiastic about the property and I do not think Rio Tinto acquired it. In the late winter of 1930 they decided to go ahead in N'Changa and to send George there to take charge of the development, the prospecting, mapping and planning. He wrote to us urging us to come over for the two or three weeks before they were to sail to Cape Town. After some red-tape delay, I got permission to leave a little before the actual end of term and we sailed to Southampton in May. How beautiful it was in the Surrey hills that spring with all the gardens ablaze with rhododendrons, azalias and gay flowerbeds.

Elizabeth and Mary, now almost five and three and a half years respectively, were darling little sprites with extremely English accents. George and I cycled each morning to Gomshall to get the London train to Annongate. Then we would get a cup of coffee at a convenient Lyons before going to his office by about 9:45 A.M. His draftsman would already be at work and while George was busy with his maps and reports

or gone off to the Head Office to see Sir Auckland, I would sit on a high stool at a high desk and write letters or work on an article for Discovery or the Atlantic. I loved those days and the late afternoon journey home to the family. One Saturday George, Olga, Aunt Mina and I went up to London to Covent Gardens where "Parsifal" was being given. When I had gone for tickets I found everything sold out except a few seats in the next to back row of the "gods". The slope was so steep that Aunt Mina became dizzy. George took her back to the wall behind the rear aisle and hoistered her onto the window ledge where they sat for the entire three parts. Between each part an hour or more allowed everyone to leave the hall for nearby restaurants for dinner or other refreshments. What a marvellous evening that was, the music, the acting, the solemnity and the splendid staging.

Another day Olga joined me in the afternoon and I took her to the meeting of the Royal Astronomical Society at the R.A.S. rooms in Burlington House. There she met my genial friends, Dr. W. M. Smart and Sir Arthur Eddington. I think that was the meeting when Dr. J. S. Plaskett gave an address on Rotation of the Galaxy, presenting convincing evidence from the spectrograms taken by the 72-inch reflector at the Dominion Astrophysical Observatory at Victoria, B.C. of which he was the Director; work for which he received the Gold Medal of the R.A.S.

The day of their departure came. We drove up to London and went directly to the docks. Elizabeth and Mary were very excited and they chanted over and over again "I am so happy tomorrow, I am so happy today". They went on board, slept on board that night and sailed very early the next morning for the long journey to Cape Town. Aunt Mina and I returned to Clereholt to stay with Beatrice and Edgar for two or three weeks.

After a brief stay in Eric Crichton's hospitable home they took the long journey north to N'Changa where they lived for a happy and interesting year. On one occasion the Governor General of Southern Rhodesia and his wife, Princess Alice, Countess of Athlone, came to N'Changa. George gave him a tour of the region while Olga was delegated to show the more local points of interest to Princess Alice.

On the 19th of April, 1931, Patrick was born in N'Changa with the skillful and kindly assistance of a nurse sent up to Olga by her brother Eric. Not long after this event, the bottom fell out of the world's copper market and a bombshell came from London: they were to return to England after which George would be no longer on the Rio Tinto staff. This was indeed a blow and there was no alternative but to return to London, then deposit the family at Carrowgarry after selling Clereholt. To find another job in the midst of the depression presented George with a bleak prospect.