

Chapter 17. Overseas Trips, Diary Extracts on Science

Introduction

The background to these extracts from the diaries my father kept on his trips overseas, to Europe in 1931 and to North America and Europe in 1937, is set out in the Introduction. This chapter contains some of his comments on scientific matters, particularly the geology and geography of places he and my mother visited, discussions about these fields of science and his other great interest, australites. Only a small proportion of the entries dealing with science have been selected and these have been severely edited. Each entry is distinguished by the accompanying date and place.

1931 Trip

Travelling over in the *Balranald*

27 August 1931, Aden

Hartung and I, by courtesy of the skipper, went up on the bridge, and I had a good look at the charts. It is really marvellous what a collection of valuable information they represent. It is equally marvellous that they have several errors, such as the geology of the peninsula of Aden, a high rugged land joined to the mainland of Arabia by a low sandy swampy isthmus. The pilot book asserted that it was limestone. On the other hand the chart showed a beautiful, and unmistakable, example of a symmetrical crater, breached to the east, 1,800 feet to the rim, and heavily eroded by valleys.

Aden is really beautiful as seen on a moonlight night and it was one day from full moon. Captain Duncan, who was stationed there in 1924, told us a number of very interesting things about it, and one of them was that it was basalt. And so it proved, or rather it is a basic igneous rock—perhaps middle Tertiary, by the erosion, but it may even be Pliocene. The arid land erosion is absolutely beautiful.

The second peninsula was said to be granite. There may be some granite there, but a great part of it is certainly a basic igneous rock, much rotted, stratified; brown, green and ochreous colours. As a compact lesson in the erosion forms of arid lands I had one of the most interesting few hours of my life. In the magic of dawn, and before sunrise, the hills were flat, like black cardboard cut out and placed against the sky.

Coming out from Aden the sea was chocolate brown; indeed in some cases it was a real blood red. I thought it was due to red mud but an old friend got his bucket out and examined some of the water. Great glee. It was due to billions of minute animals. Mrs Dodwell thinks they are a form of peridyne; it was a thrilling experience to be able to trace such a large-scale phenomenon to so small a cause.

6 September 1931, the Coast of Spain

Now we have had three hours of excellent observations of Spain—of Granada, of Moorish fortresses and towers, of white clusters of what are probably monastery villages high up on the mountains. The mountains are the Sierra Nevadas—the original Sierra Nevadas. We see also smelting works and difficult coastal roads. The towns are most numerous and very distinct. The air must be very clear, for we can see trees and lines of plantations, though the coast is seven miles away and the plantations much more. In spite of all this, the general aspect is utterly bleak and barren. The first town we saw was Almira, noted for its wines. Now we come to Malaga, noted for wines and raisins. The strongly ferruginous slopes are planted, and here may well be grown the vines that make port wine. It suggests to me that we might plant more vines in our less well-watered and less fertile areas, on hills, to get wine to the European taste.

One thinks of the Moors and the Arabs—who were also the Moors, and of the Cid and of Ferdinand and Isabella, and of the mighty struggles and conquests that went on here for centuries. Here science, in the form of alchemy, entered Europe with the Moors. The windowless flat-roofed houses are suggestive of Arabs and the names of some places show this influence also. Gibraltar, for instance, is such an Arab name—a corruption of Jeb-el-Tar or something of that kind. It is just behind these hills, which are of ancient rocks, of which some geological structure can be made out in the colours, and in the positions of the villages, etc.—just behind is the land where lies the Alhambra, greatest work of all Moorish architecture, so near and yet so far. It is most extraordinary that so barren a country should have such a population.

There is a village at each place where a larger valley emerges onto the coast. The mountains must be well over 5,000 feet high, unbelievably rugged, red, cream, brown, with just a few tufted trees. I fancied I could see a eucalypt grove or two along the deltas further back. The river valleys are wide. A lady from Burma told me they had similar 'rock-waste' valleys in Burma, dry most of the time, torrential at flood time, called *chaungs*. The same thing as the *wadys* of Egypt and Arabia. We have them in northern South Australia but have no specific name for them.

Evening. This coast of Spain is altogether entrancing. Glorious mountains, bare, reds and browns and creams, thousands of feet high, scarred and gullied with most gorgeous stream sculpture. They look as if, in Australia, they would carry about 10,000 sheep and support one squatter. Here it 'runs' scores of villages, and some quite large towns. Up the mountain side there are glittering white villages. Mostly at sea level, but some at other levels one or two thousand feet up and barren looking red hills planted with vines—all this on a stupendous scale.

The scenery grew on one. I did not like it at first, too grim and bare, but long before we got to Gibraltar, at Almira, Salabrena, Motril, Malaga, and at least one hundred other towns and villages, one fell in love with the exquisite scenery, not lessened by the white buildings, by the great forts, by the greenness where great rivers came out of these mighty mountains. It was all very beautiful, very interesting, a wonderful lesson on the geography of Spain.

At about five o'clock we approached Gibraltar. The south point, where the lighthouse is, is Europa Point. The Rock is a mere fragment of limestone, huge and precipitous, very steeply dipping, caves with rough stalactites at sea level. Very steep on the east where they have built a huge concrete rain catchment. Some scrubby growth on the western side. It is a maze of fortifications and the outline shows guns and guns. It seems a most extraordinary thing that this place should have had such strategic importance. Algeciras, of historical fame, was opposite on the north side. Genta, the great Spanish fortress stood up on the south side. Then following some fine geology and physiography came Point Tarifa, strongly fortified Spanish, a thriving well-built and beautiful city, where early customs dues were levied, and whence all the countries of the world get the word 'tariff'.

Great Britain

10 September 1931, England

The coast looks still and silent and green and watchful, and the white cliffs look forbidding, and I recall that from those cliffs came England's name of Albion (Alb = white, same as Alps)—to the French, perfidious Albion, and that these chalk cliffs are the home of the Cretaceous rocks (creta = chalk). Yesterday as we neared Plymouth and saw the fairly steeply dipping stratified rocks there, I guessed they might be Mesozoic. If I hadn't been such a goat I might have known that since the land was Devon, there was a 90 per cent chance that the rocks were Devonian! So I have possibly seen two of the source names of the geological series.

21 September, London, Faraday Centenary

It has been a gorgeous day. Instead of coming to London as strangers, we are received on all hands as guests, and given opportunities for meeting people and seeing places in a way that does not occur, for mortals like us, more than once in a century. This morning Chapman and I went to the Royal Institution. Received tickets for a beautiful full-day trip tomorrow to Windsor Castle, 'by special permission of his Majesty the King' to view state apartments and chapels and what not. Then to the National History Museum. Saw the Director, Dr Herbert Smith, and signed my name, as a delegate, in a lovely parchment volume. Also got an invitation for Peg and me to a *Conversazione* on Thursday 29th—by H. M. Govt.—guests to be received by Ramsey McDonald and his daughter. Then to the Royal Institution Reception of Delegates—a most wonderful function. I should consider it to be the most inspiring function I have ever or shall ever attend. To celebrate the memory of Michael Faraday, in the beautiful and sumptuous hall where he lectured, all the great men, mostly physicists, from all lands of the world.

Australia came near the beginning, and when my name was thrown on the screen, I rose and duly bowed to the President, Lord Eustace Percy. As each country was mentioned, pictures of that country were thrown on the screen. Two of my slides of Adelaide were proudly prominent. After that I met, among others, Dr Fritz Paneth, who has determined the age of iron meteorites; 30 determinations, 20 of them about 3,000M years, none older.

Home, dined, dressed for the evening treat at Queen's Hall. A tremendous and wonderful gathering. The most exquisite music by the BBC Symphony Orchestra (100 instruments under Sir Henry Wood). A great gathering. Speeches by Lord Eustace Percy, the Prime Minister, Lord Rutherford, Duc de Broglie, Marconi, Zeeman, Debye, Thomson and Sir William Bragg. It was broadcast to millions here and relayed to remote Australia and elsewhere. A great night.

23–30 September 1931, London, BAAS Centenary Meeting

23 September 1931

The twentythird! The day that I have looked forward to for months as the opening of the BAAS Centenary Meeting. Now we are here. We are shifting over to the Tudor Court Hotel, Cromwell Road, right next to the places of meeting, this morning. It is a great pity one hasn't time to set down impressions in some detail; for instance to tell of the Gainsboroughs and Reynolds and Romseys at Kenwood, great masters in abundance, and of the Rubens and Vandykes and Holbeins at Windsor Castle. It is

overwhelming—(this is the correct word)—to those from our little remote homeland where a Corot and a Van Eyck in the Melbourne Gallery have in the past caused our hearts to swell and our minds to think that we really had something of the real art world of the Old Masters.

Sir William Bragg, last evening, in Faraday's own lecture hall, and with the same or duplicate apparatus, performed all Faraday's century-old experiments as he felt his way towards the 'first electric motor', the 'first transformer', and the 'first dynamo'. There are functions all today and well into tonight, so we must go slowly and not waste nervous energy. I must set aside a half day to go more thoroughly into the preparation of my own paper, which is still one week away.

Went to the Installation of Jan Smuts as President in the Albert Hall. A vast show. Seats 10,000. Sat with an elect crowd of some 200 or more. Had to walk up and be received as delegate for the Royal Society of South Australia and shake hands with Smuts. Then a Royal Message, etc. and out. Went again to reception rooms, etc. Then to this hotel, very convenient. Dressed for dinner—in the glory of white vest and all. Peg with her new green silk dress, in which she looks very nice. Then, with Hartung, to Westminster Hall (Wesleyan, a fine building, with a glorious view from a great window of the Abbey) and heard the Presidential Address. Enjoyed it very much. A learned philosophical dissertation by the soldier, lawyer, statesman, philosopher, Smuts. A most brilliant gathering. It was curious to note that while Smuts eulogised the imperishable glory of certain men in unveiling the mysteries of the atom, etc., these very men (the Marchese Marconi, old Sir Oliver Lodge, and Lord Rutherford) shivered and put on their overcoats because there was a draught!

24 September, 1931

At 10 am I was in Jehangion Hall, a good crowd, several hundred geologists, to hear Professor J. W. Gregory's presidential address on 100 years of geology in Britain. Saw Skeats and Bronwen (of Delft). At 11 left and walked the half mile to Section E (geography). I see they have put me on the Sectional Committee. I shall attend tomorrow morning. It is very hard, as it always is to me at AAAS meetings, being torn between three sections; Education, Geography and Geology.

Heard the last of Vaughan Cornish's address. A very good speaker. Author of the *Great Capitals*, and of several other books I have studied and quoted from. Sir Halford Mackinder was in the chair, pal and co-student of Sir Baldwin Spencer. Quite different from what I had pictured but a very pleasant gentleman and also a delightful speaker.

Then listened with much joy for an hour to H. R. Mill, geographer, on his reminiscences and readings of 100 years of geography in the British Association. Most delightful. One of the readiest, most humorous, and most fluent speakers I have heard. And he is 71!

The Royal Society's *conversazione* was a most brilliant affair. There were hundreds and hundreds of people there—the people, Lords and Duchesses and Counts and Earls. Mere knights and their ladies came in droves, while professors and doctors from all the Universities of Europe and America were in profusion. Some beautiful women and magnificent dresses. And decorations! And the supper and wines! The sherry was very good. But the outstanding things there were the wonderful exhibits. Manuscripts and apparatus, historic, of Charles II, Faraday, Cook, Hooke, Priestly, Newton, Rainford, and many others. Most entrancing things.

25 September 1931

Went to the Sectional Committee meeting in Geography. Then heard the Presidential Address by Sir Halford Mackinder, which was very good. Then followed Griffith Taylor, on geography and nation planning. I brought him home to lunch and we three (Peg and he and I) had a pleasant talk. The third lecture, apart from an interlude by Baron de Geer, the Norwegian who has done such wonderful work in measuring post-glacial time, was a paper by one Professor Verinskiöld, of Oslo, on the recession and advance of glaciers. I have a most dreadful headache, but must now set about dressing for dinner, and then we shall go to the reception by His Majesty's government and the Imperial Institute, at South Kensington. 11.30 pm. A very pleasant affair in many ways, but like all these receptions, most boring in others.

Went into the galleries of the Imperial Institute and had quite an interesting hour looking at the wonderful exhibits of the economic resources of the Empire so beautifully and attractively displayed. Australia's exhibit is good, and parts of it made me feel quite homesick. But there is a lack of the dioramas that are so interesting of other lands, even of little places like Trinidad and Fiji.

26 September 1931

Great Hall of the London University this morning. A crowded audience, 8 or 10 loud-speakers in the hall. In a discussion on Population Problems; heard six of the leading men, whose names I have heard and whose writings I have read for years. Julian Huxley (who is young, slight and an excellent speaker), Hogben (small, witty, delightful) his quips re soap, electric light, modern hot baths and the population problem were most delightful, E. W. MacBride, a great old Battler, have admired him from

afar for years, F. A. E. Crew, who has done all the genetic work on fowls, sex changes, etc., J. B. S. Haldane who wrote that great book that Birkenhead copied, Carr-Saunders, leading British author on population problems.

27 September, 1931

Excursion to the Chiltern Hills. The thing I should like to write about, had I the pen and the time, would be the English countryside. What a land! What a country to be born in, and to love! It is wonderfully beautiful. Stable. Complete. Rich. Peaceful. Fertile. The trees! The people! The crops! The villages! In the copses where we wandered over the uplands pheasants rose in coveys. The people told us there was other game. I saw a dead hare, shot and not found, and many rabbit burrows, and 5 young dead moles. There were foxes also, but these are of course not shot. The glorious, tree-clothed, hedge-rimmed emerald-green flats were great places for fox hunting in the season. This is taken as a matter of course. No one sees the immense amount of class privilege wrapped up in this idea.

Thousands of other impressions. Curious houses, and curious signs, and strange thatched or tiled or shingled roofs, and touches of autumn, crimson and gold, and reeking fertility of unwanted (at any rate unused) grass. It is always green, though one man explained to me that, while it didn't alter much, a little browner in winter, and a little greener in summer, it was never really green! The driest part of it was much greener than our Botanical Garden lawns!

28 September 1931

Up early and off to the Royal Geographical rooms. At 9.15 the Sectional Committee met. Quite a big crowd of geographers on it, including many people whose books I have read for years. I may note here that after I retire to rest each day, mostly some time after midnight, there come to my mind scores of interesting things of which I made no note, interesting people I have met, or new ideas obtained, or curious things noted. But, from a talk at the University—with Rudmore Brown, whose charming book I have loved for so long, down to the episode of the 'small beer' and cheese at the strange little inn at Royal Oak, at Chapelford, Hertfordshire, I don't think of them. One's mind gets full to overflowing of new impressions. Then the time comes when one's mind is so tired that no more can be received.

At the Geographical Section there was a great discussion on the Earth's Crust, its composition, temperature, movement, etc. J. W. Gregory, Sir Halford Mackinder, A. R. Hinks (Sec. Royal Geographical) A. Holmes,

H. Jeffreys (who is an FRS, and one wonders why—though I believe he's a marvel at mathematics), G. C. Simpson (who is an out and out supporter of Wegener) etc. At 1 pm we adjourned to the de Vere Hotel for a luncheon. Vaughan Cornish presided. I walked across with two Americans (Brogg and Huntingdon) who were introduced to me by Griffith Taylor. Met also Slöss from Heidelberg, and talked of Geisler etc. Sat at table with Ogilvie (Glasgow), Verenskiöld (Oslo), Wellington (Pretoria). At 5 pm set off for the Albert and Victoria Museum to hear the lecture on *Sinanthropus pekinensis* by Professor Elliott Smith. It was a great lecture. I would not have missed it. I expect I should have said that also of a hundred others that I have been compelled to miss.

Dressed after dinner for the Reception at the University of London. It was down for academic dress, but I loathe the conspicuousness of that scarlet and green gown, so went without it. When I got there, and had parked my coat and scarf, I saw that the placed reeked, literally, with scarlet gowns so my desire to be quite ordinary asserted itself and I hurried, bareheaded and in my dress suit, back through these unquiet streets to my hotel. Got my gown and hood, back to the reception and so appeared in full plumage.

Tuesday, 29 September 1931

Cut Geography and Education today and went to the Central Hall, Westminster, via underground, to hear the discussion on 'The Evolution of the Universe'. Very fine. Unique. Impressive. All the masters of the question from both the material and the spiritual side. Consider them, each at his best, and reacting to the thoughts of his most notable colleagues and opponents, and stimulated by the vast audience in that great and capacious hall. Sir James Jeans, FRS (introduced it) Professor E. A. Milne FRS, Head of Cambridge Astronomy (Peg says Oxford), Professor de Sitter (Leyden) a most delightful speaker. Sir Arthur Eddington, very decisive and original, Professor R. A. Millikan, chief American, cosmic rays, The Lord Bishop of Birmingham, Bishop Barnes, very good, popular and pleasing, General Smuts, A1 as he always is, Monsieur L'Abbé Le Maître (whom I have quoted so often, quite clear, for a foreigner) and lastly old Sir Oliver Lodge, as precise and clear and definite and loud-voiced as one could wish. He brought in spiritualism a little, but not too much, did not do so except by implication.

Wednesday, 30 September 1931, My Lecture

This has been a great day, a very wonderful day, a day never to be equalled. It is marked by three things, and though it is now after

midnight, and I must be up early and off to Cambridge, still, I must set down some notes of them.

The three things are:

1. I delivered my first, and perhaps last, address to a London audience, a big audience for a Sectional meeting, at least 250, all geographers, and representative of all countries, and it went off 'beautifully' (This is Peggy's description; she was there).
2. I went, by invitation, to Downe House, where Darwin lived and worked; and enjoyed and absorbed the inspiration of that very wonderful shrine.
3. I (we) in all cases, nearly, I, of course, means 'we', went to the Guildhall Reception, and were duly announced to and received by his Worship the Lord Mayor of London, with hundreds of others, in the most wonderful building that we have yet seen, surrounded by some of the most wonderful treasures of time and art and history – all displayed so well that one could spend months in looking at them. And I ate *paté de foie gras* and drank champagne (here I does not mean we).

Felt very nervous about my paper this morning, for after all it was really the most important thing of the whole meeting for me that I should do this thing well. There were three papers and good audience of English, American and foreign geographers. Sir Halford MacKinder in the Chair. The fine geographical hall all in order. The first paper was 'Land Utilization in South Africa' by Professor Wellington (Pretoria), the second by me, and the third by Professor Burfee of Canada, a real Imperial affair. Wellington got through his in good time. Very interesting and much along the same lines as me, with spot maps and so on. Then me. Was ghastly nervous till I got a start, and then felt perfectly at home and went on and told them, with maps and pictures, all about this unimportant little country of South Australia. I got a very good reception at the conclusion and as I sat down, someone behind me caught me by the shoulders and congratulated me. It was S. H. Smith, of Sydney, and very kind it was of him to come around to hear me. Then another man came up and sat in front and was complimentary, and Dudley Stamp and Huntingdon of Columbus, Ohio, and Kissing of Birmingham, and Verenskiöld of Norway, and Griffith Taylor who had come in late. The chairman made quite a long complimentary speech, and had evidently seen my book [*South Australia—A Geographical Study, Structural, Regional and Human*] and told them that if they wanted to know more of my work they should buy the book. So Peg and I walked home on air, and I felt less tired than I had done for the whole week.

After lunch we went by coach through the miles and mazes of South London into the glorious fields of Kent, and out to Downe House. It was really wonderful to walk along the 'sand walk' that Darwin called his thinking path, to see the lawns where he did his earthworm experiments, to see his study exactly as he used it, with his pens and papers and opened envelopes, and a few fossils and minerals (selenite and pyrites, etc.) lying about, and so on.

1–3 October 1931, Cambridge, Clerk Maxwell Centenary

On Thursday morning Hartung and I set off for Liverpool Street by Tube and then on to Cambridge for the Clerk Maxwell Centenary celebrations. A delightful place. I had thought to arrive at a town in which there was a University. Quite different. It is a town which *is* a university. Everything is so different from what I expected, despite talks and photographs and descriptions. It was so quiet and restful after London, and all the places one wanted to go to were so near.

The taxi dropped Hartung at Pembroke College and took me on to King's College. There I was, alone almost in those great grey stone buildings and wide squares and age-old traditions. No one met me. It is not done that way. The porter at the Lodge conducted me to Guest Room A, a fine large room with marble fireplace and a nice coal fire and a huge Gothic low window overlooking King's Parade. Monarch of all I surveyed. There were several letters and papers and invitations awaiting me. It was obvious that the Cambridge affair, the Clerk Maxwell celebrations, were to be more generous and much better organised even than the London ones.

In the official number of the *Cambridge University Reporter*, one sees oneself listed with what is perhaps the mightiest and most brilliant array of chemists and physicists that have ever come together. One [C.F.] is set down as the chief representative from Australia, and President of the Royal Society of South Australia. Towards one o'clock the scarlet gown is donned, and off we go. I was diffident at first about even carrying that red gown on my arm in the street, but before I left, having lived and walked and dined in it, and walked all over the place in it, and seen the streets filled with gowned men of all the colours of the spectrum, well, I got as used to it as I am to my normal overcoat.

At 1 pm we arrived at Corpus Christi College. A fine banquet in the Great Hall. Sat with and talked to Professor Wasastjerna (Finland) opposite, Perrier of Lausanne and R. H. Fowler, of Cambridge, son-in-law of Lord Rutherford. All very pleasant; so was the food. This country (at banqueting times) is a wonderful place for food. The caviar was fine,

and the champagne and other wines most excellent. I dined and wineed well. Then we formed a procession, as set out in the printed syllabus, and up the main street we marched to the Senate House, the Marchese Marconi, in his blue and silver and ostrich feathers, and gowns and uniforms and tassels of scarlet and green and blue from all the countries of the world. My partner in the procession was Professor Schonland, of Cape Town University, very agreeable.

At the Senate House we sat in serried rows, and when our name and standing were announced we approached and were welcomed by the Vice-Chancellor (Baldwin is the Chancellor, but couldn't leave London owing to government difficulties). Then J. J. (Sir Joseph) Thomson delivered the Maxwell oration. Very fine. I have it, and the eight other great addresses I heard at Cambridge, all in print in a book so that you may read them.

The young man who makes the beds and who 'dresses' one had promised to call me at 8 am. He did so. He also took all my clothes and boots and brushed them, and then set them out in order as one dresses, socks half turned, etc. Most curious and interesting. And he took my flung-off evening clothes and folded them away in the most professional way. It was alright as an experience. Still, I prefer to dress myself, and I forestalled him the next morning, by being dressed and brushed up when he came to call me at 8! He was equally surprised, and his unspoken query caused me to say 'I was restless, and got up early.' 'Then you are ill, sir?' 'Oh, no,' I replied. 'Ah, sir, you have been overworking.' 'Yes', I said. These people are well trained.

At 10 am was with the gowned mob at the Arts School. Sat with Kerr Grant and Hartung, an island of Australia in a sea of foreigners. Lord Rutherford in the chair. Had three of the most delightful addresses by Max Planck, of Berlin, the discoverer of the quantum, possibly the most brilliant man in all that brilliant crowd, and some most charming reminiscences by Sir Joseph Larmor, who knew Maxwell, and by Neils Bohr, of Denmark, unraveller of atomic structure. His address reads better than it sounded.

Dr William Garnett told us that when 'J. J.' (Sir Joseph Thomson) came as a young man to study under Maxwell that Maxwell summed him up after a couple of weeks. He said 'Garnett, Thomson will never be able to tell the things that are hard from the things that are easy.' Now, well over 80 years of age, Master of Trinity, and one of the most loved of these great physicists, Thomson is still full of life and energy. Back to Kings and lunch in the Hall. In the afternoon at the Arts School, and then a wonderful series of lectures. Sir Richard Glazebrook in the chair

(whose textbooks I was partly reared on), Sir Arthur Schuster present as guest. Addresses—brief, direct, and full of meat by Sir James Jeans, Dr William Garnett, Sir J. A. Fleming, and Sir Oliver Lodge. They may say what they please about the old man, but Lodge is still one of the giants, mentally as well as physically, even among all these mental giants, and that in spite of his spiritualism.

At 8 pm we were due at Trinity for the chief Banquet. A magnificent affair. It was indeed beyond description. The conversation and speeches were fine. The caviar was excellent. The wines, including 91 year-old Madeira (Old Burl 1840) were fine, and I did quite well on all. The Latin graces, chanted, the singing from aloft by a choir of boys, the age-old candle lighting, all these were wonderful. There were 206 guests at the tables, and I supposed I was the least among them. However, I did enjoy it all.

Slept well. Breakfast in the Combination Room. Then Dr Rothenberg ran us out to Ely to see Ely Cathedral. It was a beautiful run. His car was fitted with a drive that needed no awkward gear-change; I think it is called the 'Wilson' gear. Most admirable. Ely Cathedral, with its traces of the story of Hereward the Wake, and its tombs of ancient men of every age, and its vandalism—where beautiful stonework was smashed by the Danes when they massacred the inhabitants and plundered the cathedral in AD 870. Cambridge is young compared with this; just as this is young compared with the pyramids; but we in Aussie are spell-bound with them all, for all we have is so new, so superficial, so lacking in tradition. What we must do is to preserve all we have, and put some tradition into it.

Was glad to have a good long run over the Fens. They are wonderful and remarkably fertile. Here in the marshes, according to A. G. Fenner, lived the bloodthirsty robbers, who were the ancestors of the modern [English] Fenners, and who waylaid travellers across the marshes. It must have been a great life. To think that one must fall from that to the dull routine of a Superintendent of Technical Education. God help us all.

Australian History, Memories of Charles Sturt

19 September 1931, London

At one o'clock, arrived at the Empire Club, 69 Grosvenor Street—the club of Mrs G. R. N. Sturt. Mr and Mrs Sturt were there waiting for us. He is the grandson of Captain Charles Sturt. He was most interested in all we have done and what we think about Charles Sturt. Mr Sturt mentioned the Crossland portrait of Sturt, in the Adelaide Gallery, saying that Mrs Sturt didn't like the colour of his waistcoat in that picture and

had another painted, with a yellow waistcoat, which they have inherited. Also that a popular picture of Sturt on the Murray, showing him with a large pipe in his mouth, offended Mrs Sturt, as Charles Sturt did not smoke. This Mr Sturt is a most cautious gentleman and in stature and appearance seems to me to resemble Charles Sturt. I hope I may be able to run up to Bewdley, Worcestershire, to see Mrs Beatrix Sturt.

10 and 11 October 1931, Bewdley

Winterdyne, Bewdley—the home of Mrs Beatrix M. Sturt, daughter-in-law and biographer of Charles Sturt. In musings on this great trip to England the desire has always been paramount to me, and the mental picture most clear, of a trip into the English countryside—the real England. I never dreamed, nor did Peggy, that our wish would be so amply and so bountifully fulfilled, as in this weekend we are spending here with a most delightful and most mentally vigorous lady, Mrs Napier Sturt, and her daughter Catherine. Here we are, in the heart of this fine old English home, receiving the warmest entertainment, among the oak and beech woods and the copses on a high cliff overlooking the River Severn and its perfectly beautiful Worcestershire Valley.

We left Paddington Station at 9.45 am. Thence along the Thames Valley to Reading, Oxford, Everham, Worcester, where there is a beautiful cathedral and where poor forlorn old King John is buried. Then we got to Hartlebury, and got out and found the chauffeur and Mrs Sturt, and had a lovely purring drive along the close well-grown roads of this part of England. Altogether beautiful, and fertile and bounteous, and quite indescribable. What a land to love and to fight for. What a land of comfort and culture men like Sturt gave up to come out to the hardships of Australia! Winterdyne, with its three storeys overlooking the Severn, and its farms and coppices and lush green fields, is a lovely old home, and Mrs Sturt is a wonderful hostess, and we are enjoying our stay most keenly.

When I think of Frank and Tom coming to dinner without a collar, or even in a rough sweater, and remember Mrs Sturt's apologising for the fact that they always dress to teach her grandsons 'to be decent and tidy', I blush for them and for ourselves. Factory smoke can be seen from Winterdyne. Three or four separate huge power transmission lines run across the country. So the tail of the dragon is here and still, there is much of 'beechen green and shadows numberless' that nothing can touch, and the softness of it all, the glory of the landscape, and its richness in history and mystery.

This is quite a big establishment for Mrs Sturt and her daughter, unusually so to our Australian eyes. Some seven or eight maid servants, and seven men. I should really have made full notes of the manuscripts of Sturt's overland journey with cattle, and of the pictures and medals and souvenirs, and of the incidents that Mrs Sturt has told us about, but it is quite impossible.

1937 Trip

United States of America

Note by FF: *The 1937 trip, made with Mother, Draper and Elizabeth Campbell as companions, involved crossing the Pacific Ocean and arrival in San Francisco and then visits by train to various places in western United States before going to the east coast and then on to Europe by ship. There follow selected entries containing comments of scientific interest.*

28 March 1937, Yosemite

By train from Oakland, and on through the foothills, like the Berkeley Hills, but not so much built on, then at last we got through them, and there before us lay the immense, rich and wonderful San Joaquin Valley, a natural wonder of the world. 250 miles widest place east to west, 150 miles north to south, really runs north and south, between the Coast Range and the Sierra Range, 'the dim Sierras far beyond uplifting. Their minarets of snow'.

Well, this San Joaquin Valley surpasses description, its wealth and fertility and the teeming thousands of its population. We have little patches somewhat like it at Berri and Tanunda in South Australia. But here there are untold thousands of acres, and all richly fertile. The density of the houses, and the fertility and the belts of trees remind me of the Po Basin in Italy. And of course it is like Italy and South Australia—a Mediterranean climate. One sees sheep and wheat and figs and olives. But such vast fig orchards and such immense rich stretches of lucerne (alfalfa), grasses, orchards, and vineyards I have not seen. All the valley floor appears to be good. No bad or salty patches.

We rose from the flat irrigable land quite suddenly. It became grazing, cattle, dairy, and later (higher and more rugged) beef land. These were the foothills of the Sierra Nevada (Snowy Mountains). Trees mainly live oaks. As we gradually climbed higher, other trees occurred, digger pines and cypress pines, and later giant redwoods, all rather young.

From Merced to this very comfortable and beautifully appointed Awahnee Hotel, from which we travelled next day by car. Bang up against the Falls and the Precipices and the majestic halfdome—which

impresses me vastly and which no words can describe. A light or two has appeared through the pine forest down the valley towards Yosemite Lodge. The threatening clouds have cleared up a bit. It is absolutely calm and peaceful. Elizabeth peeps in to enquire whether she should change her dress for dinner. There is a very bright planet to the West. It must be our own old Venus.

Have had dinner. As usual it is too abundant and too rich. Prodigious helpings are given. Some of the foods with the same names as ours are different—richer and greater in quantity than one expects. Today's drive has been a glorious one to me. It is the complete realization of satisfaction to travel through new country such as this. If only a Western geographer, a geologist or both could have been on the trip to tell me some of the things they have found out about the areas, it would have been the Summit. Still, as it was, with a very good driver-guide to answer questions it was excellent. The human geography of the vast San Joaquin Plains was obvious for the most part. The gorgeous sculpture of these great Sierra Nevada Mountains was magnificent to see. Trees, hills, gorges, canyons, Merced River, abundant falls, the few houses and people. Then the magnificent Yosemite itself.

29 March 1937, Monterey

At Del Monte, Monterey, old capital of California, home of the Monterey Pine (*Pinus insignis*, *P. radiata*). That beautiful waterfall that I saw and admired from our window in Yosemite at the Awahnee yesterday and last night was not the Bridal Veil, but the upper part of the Yosemite Fall. It is very like the Bridal Veil, but in these seasons of melting snow, there are twelve or more beautiful major falls and an infinite number of minor falls pouring into the Yosemite Canyon.

Decided that Peg and I would go to the Mariposa grove of big trees. We went 36 miles up, up, up the sides of the canyon to the tops of the snow-covered pine forests of the High Sierras. A great experience. The country is composed of massive schists and granites. The story is one of prodigious and repeated earth movements, uplift of the Sierras and Coast ranges, down-throw of the San Joaquin and Santa Clara areas, and also of the Pacific.

The car was fully loaded. We were told to put on cloaks and gloves. We were given blankets and rugs. We hired snowboots and were glad we did. Went through the remarkable tunnel that leads upward out of Yosemite – nearly half a mile, with three ventilating tunnels. Special fans, electric, and carbon monoxide indicators and semaphores. Electric lit. Then on, winding around valley sides through the cold pine forest

area, a fine geographical and climatic experience. Saw no bird life. Two bears were about but another 180 were still hibernating. Saw a skunk, and a physician on board told how one had spit in his eye one night at his rubbish bin at home and how he had smelt for 10 days despite all efforts. The pines, cedar pines, sugar pines, yellow pines, cedars, redwood (sequoia), black oaks, live oaks, maples, all in their order. No lesser trees, no undergrowth, and no grass, only a carpet of pine needles. Not sure as there was six feet of snow everywhere. In the end, past Wawoona, to the Giant Grizzly, said to be the biggest and oldest living thing in the world, there was a bank of snow 12 feet high. Walked across the snow to the Giant Grizzly 3,800 years old, 90 feet to first branch.

All very wonderful. Rock slides everywhere. Gangs at work clearing them all the time. Made first contact with the US CCC—the Youth Unemployment scheme of America. Saw lads up in the forest planting trees, \$30 per month, and keep, have to send \$20–25 home. Speak warmly in praise of it. Costs money. But it has great popular support. In this democratic land there is a real regard for the welfare of the unemployed youth.

Got back, fresh, cold, crisp, and rosy. Just in time to pack up, and feed up, in the luxurious Awahnee. To Mariposa, poor little village, but quite a beautiful new school. Stone or brick, low spreading well lit, with coloured glazed panels like Mosaics. School just out. Six large buses there to take the lads and lasses home. All very happy and cheerful. All transport is free, paid for by the State.

Down and down, to the cattle ranch country, and to the dairy ranches, and to the level land and to Merced. Saw again at Tuttle the Fancha monument. Very fine and ambitious. Erected by Mr Fancha to himself during his own life. Others do it too, but not quite so openly and unequivocally. At Merced railway station—Jack de Witt, smiling, awaiting us. Got into our Parlour Car de luxe. All to ourselves and off to Monterey, on the trail of the early Spaniards. Miles and miles and miles, maybe 100 or more of the marvellous San Joaquin Valley. In some ways equally remarkable a physiographic feature as Yosemite, and financially and socially immensely more important. A Bacchus Marsh and Tanunda mixed, but much more fertile, and extending for hundreds of miles as far as one can see—to the Sierras on the east and the Coast Range on the west. And abounding water for irrigation. Channels everywhere, and lush high green crops of lucerne and cereals. Some cotton. On through Las Barras, into the defiles of the Coast Range, up and down the striking Pacheco pass, through Hollister—a fine progressive town, Mexican.

Through San Juan Bautiste where the legend is that the swallows return every March 8 (Peg says 17th). They grow very good wine here—more mellow and mature than ours. And they sell it cheap! At Merced here was the only place in all my travels, and in all my experiences with the wine of the country, where I have got a glass of wine (very good sherry in this case) with my meal with no additional cost. Indeed wine (no matter what kind) is 10¢. Tea is 15¢! Peggy's drinks cost more than mine. The tiniest roadside place, abundant ordinary shops, any eating shop, most chemists, *all* sell alcohol. The Marne shop pays \$80 per annum for a license.

Then, in the dark, through what appeared to be attractive and mysterious country to Salinas—a fine energetic progressive town – full of light and comforts and bustle. About as big as Gawler or Port Pirie, but with ten times the kick and energy and enterprise. Australia (I love thee still) but it's a dead old place.

30 March 1937, Monterey to Los Angeles

Having the huge luxurious parlour car to ourselves, and Jack de Witt being so obliging, there was no rush. We left about 8.30 am. Did the world-famous '17 mile drive' of Monterey, now 26 miles. Hills, plains, beaches, cliffs, forest, golf links, a most gorgeous panorama. Saw several places that have been used by the film companies for pictures, one for the coast of France (*Les Miserables*) and another place that was palm fringed and was used for tropical pictures in *The Mutiny of the Bounty*. Monterey, apart from the 21 mission centres of Fray Junipero Serra (buried here), is by far the most historic centre in western USA. Was the old capital under Spanish rule. Then it became the capital when this was part of the Mexican Republic, but was displaced by Sacramento when the US Government took over.

Around Salinas many thousands of acres of beautiful land, the Salinas Valley. In one place vast never-ending fields of lettuce—supplies New York etc. At another the biggest sugar beet factory (Mrs Spreckels) in the world. At another, all walnuts, another small pink garden peas, another artichokes which grow along our roads, and so on.

In each centre, whoever one is talking to, the High School is always shown as an important building. It is well to the front, well cared for, with beautiful grounds, and everyone is interested in it and proud of it and expect others to be. Quite different from our country towns and high schools.

At Barkly it was again more hilly, uplifted alluvial country, rounded hills, and here the chief export crop was almonds. Seems a good idea,

this specialization of one area in one crop. The river terraces of the upper Salinas River were most interesting. The stream is wide, heavily loaded with silt, and braided. Many long bridges. From dead level in the north, about 100 miles south they are uplifted. Naturally these alluvials are profoundly eroded. Very well developed river terraces, affecting crops, roads, railways, bridges, everything. This was a long study, the erosion, old and recent of the uplifted alluvials. Most of them look Pleistocene to me. But they may in places be Middle or earlier Tertiary. Saw four or five oil fields. Small, some in valleys, some extending into the sea, some on the very hilltops, some on the slopes.

In the irrigated fields, vast things they are, often unfenced along the road, Filipinos are the chief cheap labourers. One 'section' we passed through was Mexican, peons, poorish but varied houses, low standard of living.

The signs along the road that are commonest are first EAT or EATS, and after that GAS, REST and so on. These then are the prime needs of men. Everywhere there were 'Auto Courts'—with rows of cabins for travellers. Excellent ideas of comfort, service, business, enterprise. We are dead and stiff by comparison. Americans appear to feed *very* well. We have been with Draper and Elizabeth Campbell for four weeks now, feeding American style. We have fed under all sorts of conditions. We have never ceased to marvel at the amount, the richness, and the variety presented.

Through El Paso de Robles. Pass of the Oaks. Had lunch there. Very good. A narrow pass. Still traces of snow on the highest peaks of the Coast Range. But it is fast disappearing before the coming spring. Past St. Simeon Ranch, where William Randolph Hearst lived till he was taxed out of this State. St. Simeon Castle. Vast ranches. Warehouses of antiques and treasures of art.

At the risk of repetition I will say again how geographically blessed this country is. Vast series of level fertile plains, with abundant water for irrigation at all seasons, zone of western winds, mild winters, and summers not so very hot. We are seeing things at their best, clothed in the green of early spring. In summer the hills and the non-irrigated parts must be dry and brown.

After lunch we left for Los Angeles. Glorious drive, an absolute geological treat. Most of the road cut along the sea edge of a steep gullied coastline. Been a recent uplift, and the road is partly on raised beach, with wave-cut truncated ridges inland. Tertiary, sands and heavy alluvials, and some hard rocks (? Cretaceous or Mesolithic, generally) of the Santa Monica Range (4,000 feet high)—bang against the coastline.

5 to 7 April 1937, Grand Canyon

5 April, 1937

In a Pullman car, Grand Canyon Ltd, on the way to El Tovar. This is the day of our leaving the lovely land of California. When we were kids we sang, in a game, 'Over the Rocky Mountains, over the hills so cold, We'll line our pockets with the golden dust of the Californian gold.' Which reminds me how very much we young goldfields youngsters in Australia were nourished on American things. Absolutely geographic and historic. It means more to me now that I am familiar with the every day appearance of numberless canyons and caverns. In a cavern, in a canyon, excavating for mine placer material here is quite different from ours, darker and deeper, different, more vigorous erosion.

So we set off. The train journey was excellent. Views for miles of the glorious Sierra Madres in snow and forest. Vast plains of San Bernadino and numberless others. 'Little' places here and there of vineyards and orange groves that would leave Renmark in the middle and not notice it. Up a high pass, getting dryer. Arrowhead Mountains. Torrential streams. Unoccupied land, though always a few homes of men even if some very poor.

6 April 1937

Grand Canyon is a miracle. Quite beyond description. So I will not describe it, nor attempt to. It is the greatest thing of joy and enjoyment and scientific and scenic pleasure that I have seen. Its vastness and depth and variety and purples and crimsons are vivid in my mind as I write. I hope they may ever remain there, for no pictures, even the most exquisite photos and the coloured ones, can give any true idea. Then there was the geology, and the Indians, and the lectures, rocks, fossils, watch tower, ever-present snow and forest, the Painted Desert, the Kaibab Forest, and Bright Angel trail. Sir Victor Wilson and his wife and daughters were with us all day, so that our car was dubbed by an American 'the Australian car'.

7 April 1937

Spent the day crossing the wide desert of Arizona and New Mexico. Americans are quite interested as they pass from one State into another. Trainmen even, who must become used to these things, remark: 'Now we're in Ari-zorna' and so on. If we could have got away from the track the desert might have been even more interesting. For the influence of the Little Colorado River was everywhere. And there was some swampy area, and there was a little grazing, and ranches. Vastly more occupation

than our desert. But such ranches, some of them, must have been Mexicans. The most lonely, tiny, miserable places. Numberless. And also there were some fine places like 'Station homes', but not often.

The braided heavily-burdened Colorado was not many miles from the rail track anywhere, sometimes crossing beneath a broad bridge, sometimes washing against the side. Here and there were remarkable evidences of river terraces, here and there no cutting at all. But always red to salmon mud with fine silt. The water, of course, comes from the melting snows, the dust from the friable fretting ferric rocks of the Painted Desert. Grays, creams, and other pinks very abundant. As we got further on, the Vermillion Sandstones (Jurassic) stood up like vertical red walls, but carved into most curious shapes. Great cathedrals, streets, warehouses. I conceived a project in one case for carving out the inside of one great red-rock formation on the inside and forming a rose-red cathedral, like Petra, 'a rose-red city half as old as time'.

Passed close by Meteor Crater and necessarily by Canyon Diablo. Great meteorite lumps as hotel doorstops in one case. Have got to know the look of meteor crater stuff. Petrified forest close by too, but hope to see some of that later. Will get some petrified wood souvenirs. Permian? Gallup is a large coal mining town. Desert. Cretaceous. Largely Mexican, by the look of the living areas. Here and there also real Wild West towns. Girls and boys in groups and in bright coloured dresses. This I think was Buffalo Bill's country, too, along the old Santa Fé trail, though I believe he is buried at Denver.

Shall never forget the cliff panorama as we slipped down into the valley of the Rio Grande in New Mexico. Permian, Triassic, Jurassic sediments. Granites, also. And I must not forget the basalts. I twigged the first tiny outliers of the basalt flows yesterday. Great bare black raw rock masses, cracked and broken as they cooled. No change since. Then there were more and more, then dense basalt flows, then gorges, not deep. Flows mostly very mobile, about 20 feet deep. Later thicker. Mesas topped by basalt Roman wall columnar, scoria, dense as *pahoehoe* etc, a vast and very fine lava field—Recent or Late Pleistocene.

How suitable that Spain should have peopled these areas first, people who knew a land of desert plateaus, with snow mountains. No-one else, maybe, could have done it, put the missions across successfully. Near Zuna, which we saw, is the only remaining pueblo of the historic tragedy of the Seven Cities of Cibola. Though parts of these deserts look like ours, there is a variety, colour, and some quality due to elevation that is quite distinct. Another thing is the highways—road and rail.

Magnificent roads and railways. Incredibly long freight and passenger trains.

8 April 1937, Santa Fé

La Fonda Hotel. Santa Fé. Forgot to mention yesterday that when we got to the lowland there was a vast grey dreary sandy waste—all desert. Deep broad level-bedded alluvium. Through a thick pall of dust, yet not too thick, we could still detect a ghostly glimmering snowcapped mountain. Of the formations seen, there was the Mesa Verde of Gallup, with its coals, Upper Cretaceous. Navajo sandstones, Jurassic. Sauceage: the vermilion cliffs, of which the Rainbow Bridge and other things hereabouts are made; the Shinarump formations, Triassic, in which the petrified forests occur, and the Moenkopi shale of Cedar Mesa (May-sa) seen from the Watch Tower (Grand Canyon), Triassic.

The American Indians here are smiling, homely sort of folk, with impassive faces that *can* laugh. Kids real American. Dirty and spoilt. The Mongolian epicanthic fold very well marked, particularly in kiddies. This afternoon went on a 40-mile drive up the valley of the Rio Grande. Magical geography and geology. Vast terraces and plateaus and fan deltas of heavy alluvial drift. Incredible. Must have been a prodigious period of river erosion and aggradation. Positively incredible. Read Darwin's descriptions of something similar off the Andes eastward. He was shaken by the phenomenon.

10 April 1937, Santa Fé to Kansas City

The closing of my notes didn't close the day. I had just put down my pen when Draper rang me in my room at La Fonda to say that Mr Ernest Thompson Seton, the naturalist whose books and illustrations we have loved so long and so much, was in the lounge, with his wife. Went down. He is a fine figure of a man, nearer 80 than 70 I believe, but looks like a Red Indian, and clear, definite and vigorous in manner. His wife, who is most devoted (Peg says she is not Mrs Seton) is as tiny as he is big. But she too is clever and chatty. We all talked together easily and freely for an hour and a half. He was just back from a lecture tour in Bonn and elsewhere in Germany and full of enthusiasm for that country. Told us much of his work and his recent writings, his 'Indian Bible' about to be published, about Australia, in which both are keenly interested, and also about the character of the Indians. He appears to have quite dropped all his old naturalist work and taken up the cause of the Indians. Very enthusiastic. Told several stories re Buffalo Bill, whom he knew, and many other Indian chiefs and Wild West leaders. Recall one story about

Sitting Bull and the gentleman who was made Chief Scout and Sitting Bull's comment. He was most entertaining.

As we went east the land grew better and better, the rainfall was higher and higher, the fields greener, the houses more and better. Saw scores of Middle West towns, large like Emporia, Garden City, Dodge City, and multitudes of small ones. The layout and appearance of these towns is unlike anything in Australia. No fences, yards or gardens, you just see clean through the town at a glance. River terraces, weirs, oilfields, mules and darkies, wheat, corn, pigs, truck, bustle and business. Utter flatness till we entered the Missouri Valley.

28 April 1937 to 4 May, New York

28 April 1937, New York

Set out for the Natural History Museum. Reached Dr Clyde Fisher, Curator of the Planetarium and of Geology. A charming white-haired gentleman. He was interested in me (because of Professor Johnson's introduction) and in Australites, which I had taken. I promised to send him a set for the Planetarium's exhibit, which I must do as soon as I get home. He called in Dr Chester Reeds, Geology, and the meteorite assistant, Mr Arthur Draper. I showed them the Australites and the other representative tektites. They, or rather Dr Chester, was definitely antagonistic to the idea of glass *meteorites*. He thinks they are volcanic. However, each one of the four of us chipped in and said his piece. I advocated their meteoritic origin very strongly. But if I could see or hear any reasonable volcanic explanation (which I do not think probable) I would forsake the meteorite readily. Today I determined to write that paper Dr Leonard asked for, for the American Association for the Advancement of Science, and I shall call it 'Tektites (Australites)—Are they Glass Meteorites?'

30 April 1937, New York

To Columbia University, where Professor Douglas Johnson had a group of geologists to meet me. Several not there owing to other engagements, but I heard one remark to another that he'd not seen such a showing of University and Museum geologists for a long time. There were eleven professors, including Directors of Museum Departments. Professor Johnson, Professor Sharp, his chief man, Professors Krieger and Law, his department, Professor W. K. Gregory, dinosaurs and vertebrates, Professor Lobeck, petrology, Professor Chester Reeds, Museum, Dr Clyde Fisher, planetarium, and three other geological professors. Eleven. Most pleasant. Dinner in the Faculty Club at Columbia. Yarning. Australites.

Everything was very pleasant. Professor Johnson is a most remarkable host in putting everyone at ease.

4 May 1937, New York

Gave the lecture. 70 to a hundred there, six professors. The slides went well. I think they enjoyed it, and understood something about Australia. It lasted over an hour and though I was told that some of them had lectures, no one left. Then Professor Johnson handed me a cheque from someone's funds for \$50, which was very fine, and quite undeserved. Professor D. W. Johnson has made this New York visit memorable.

Canada

20 April 1937, Ottawa

Passed over an exposed part of the Great Laurentian Shield. Enormous *roches moutonnées*, for miles and miles. Granites and gneisses smoothed and planed by continental glaciers. Very level in between. A great sight. Some of the great smooth rocks so large that forests were all over their surfaces. Farms between. Glad to have discussed and been reinforced by Griffith Taylor that the structure and geology of a country are the fundamental facts of geography. I feel I have a better understanding of the land of the beaver and the maple. Not seen the great north and north-west, but have talked with men who know it intimately.

Getting to know the trees a bit. Vast forests of evergreens in places today; larch, spruce, fir, hemlock and cedar. Others are maples, oak, birch, elm, osier, etc. Steep-roofed houses, set solitary, no gardens or verandahs, unadorned wooden, lonely houses. Draper took a photo or two. Hope they turn out well. When not glaciated, then moraine and boulder clay. Boundless erratics or boulders. Here and there, Kingston, Brockville, some level-bedded dark coloured ?Cretaceous.

All these houses have central heating. Saw the ordinary plant in Taylor's basement. Coal up the basement at opening of winter. Janitor comes in and stokes it at morning and evening. Otherwise no attention. Always hot water circulation. There appear to be far fewer cars in Canada than in the United States (except at Ontario). No negroes seen. And no negro quarters in the towns and villages that I could see. Shingles everywhere. Two galvanized iron roofed barns. Stook and log fences. Real pioneer fringe. Fighting cold and water—not heat and drought. Just as hard? Evidence of abundance of wood everywhere. Arrived at Chateau Laurier, the finest hotel we have yet stayed at.

Continental Europe

10 June 1937, Danube Valley

It has been a busy day for me. From 9 am to 6 pm I have been going, with maps, panorama, dictionary, Baedeker, and worrying the anxious couriers. Talked to folk now and then. Used the field glasses on the quaint and ancient castles, fortresses, and strongholds, and also on the abbeys, stifts, churches, monasteries, and on the fields and the houses and the people.

The Danube as I have seen it for over 100 miles is comparable in beauty and interest with the Rhine, of which I have seen much more and shall soon see still more. There is, it seems to me, no saying that one is better or richer in interest than the other. Both are wonderful, uplifting, thought-provoking, inspiring. So too, in richness of interest and beauty is the Thames. And, in quite another way, the Mississippi, where I have spent only a couple of days, or the Hudson, of which I saw much more, or the Nile of which I saw Cairo to Zapazig. Indeed, all rivers, as rivers, and as the homes of men, fascinate me, even more than mountains and plains, of which they are the sculptors and builders. The Murray has its interest, and the Yarra and the Torrens, and even McCallum's Creek, at Dunach.

12 June 1937, Vienna, Natural History Museum

I saw the meteorites, a gorgeous collection. They said it was the finest in the world. And it may be. But I have now seen many fine collections, especially in London and New York, that look as if they were the largest. However, the variety here was remarkable. And the tektites were there in full recognition, labelled Tektiten oder Glas Meteoriten; Moldanites, Billitonites, and Australites. The Director of the museum is Dr H. Michel who has written several papers, and we had quite an interesting talk on the ways and methods of meteorites, especially glass ones.

Saw one of the most perfect geological and physiographic maps of the high Alps that one could imagine—the sort of map that many geologists and geomorphologists have dreamt about or imagined. It was really wonderful. A German Doctor of Science, Haecker did it. What a monument to be remembered by! There it is, forever, every detail of strata and erosion, and forest and talus, the most delicate detailed perfect thing imaginable. It is an education to have seen it. I wish our University would buy a copy of it. Went through the animals, birds—very good collection of moas here, also moa's feathers, abundant insects in amber, coal forests, models of Vienna. One can see that lack of money presses.

Nothing new seems to have been done for 30 years—doubtless since 1914!

14 June 1937, Kecskemét, Hungary

An unforgettable day. Up early. We knew that we were going somewhere, but had no idea of the great treat and novelty that had been prepared. For myself, looking at everything from the point of view of human geography; houses, vehicles, dress, crops, occupations, associated with physiographic factors, it was an immense privilege to get well out on to the great Plains of Hungary, the vast level stretches of the Lower Danubian Plains.

Driving out on our 80 kilometre motor-bus trip, along the main highway from Calais to Constantinople (excellent road), there was much of interest in the suburbs, the city buildings, the great Danube and the way its shores are intensely used here. Everywhere in the ornaments is the eagle, or rather a mythical bird the Turul which guided the first Hungarians here in AD 896. As we got out into the country there was much the same. The same fertility (though there has been a few weeks drought and rain is needed) the villages and paths. The avenues of fruit trees. The woods. But the villages were differently spaced, the houses of a somewhat different pattern, there were more ponds and geese; there were many more cattle and, for the first time, a good few horses. We were coming to the plains, the home of pastoral occupations. Cherries persisted but apricots outdid them. The cows of the Puszta, like those of the Northern Swiss, are curiously of one breed, the Puszta cattle are big horned, creamy coloured. One old bull had silver balls tipping his horns.

The light four wheeled wagon of the Tyrol persisted irregularly and gave way to a heavier typical wagon, nothing like so heavy as ours, with bent wood and iron pieces going over the wheels to the axles. These carts have straw in the bottom and a couple of seats set in, and they form the family conveyance. We drove for many miles across the plains in such a vehicle, with an old Hongroise as driver. The wells and their gear thrilled me for they are in every geography and story book of these great grasslands. The lever is weighted and the water lifter handles the rope or chain that goes into the well. One must assume that all the wells everywhere are at the same level. A great place to develop arguments against the dowsers, the omnipresence of water is so obvious.

The crops were largely maize and spuds (both the gift of America) but there were also poppies, sunflowers, wheat, rye, and many others. Much lucerne. Many women worked in the fields with the men, and almost always all were barefoot. There are no stones on these plains. Everywhere

as I saw it a blue-gray fine sand. Is it loess? I strongly suspect that it is. Too even for anything else. The land where cultivated is under strip culture, but everywhere fenceless. We saw cattle, sheep, pigs, and geese out in herds and with their herdsmen (sometimes women or children). We saw also goats and cows tethered and hobbled. Reaping is done with the scythe, and this is men's and youths' work.

The houses are often prettily red-tiled, but many are thatched. There are no building stones. The houses are not of wood, I suspect mud brick, always neatly painted white. Each house has its well. Towards Kecskemét the houses were more like ours in their spacing, but in no other way, except that they have rooms, doors, and windows. But often one saw houses set in their own gardens, on their own property, not clustered in villages so much. Often too one saw a sort of communal place for the grass hay stacks, 20 or 30 or more, all belonging to different people obviously and all in one space.

On the plain we saw three great black and white storks, and a storks' nest in a tree. Also spur-wing plovers, mole hills (many and new), and a little grey animal that may have been a weasel or stoat. The herds of horses and cattle on the *puszta* (prairie) we saw well. The cattle and horses have tinkling bells. The herdsmen are nomadic for the summer grazing season, and have movable houses.

When we got to Kecskemét, the mayor welcomed us in English, German and French, at some length in a very charming and well-decorated town hall. Then, escorted by soldiers, we took the train. Rattled along, on board seats in ordinary trucks, with a calico covering overhead. Uninterrupted view. Waved to everyone, in the fields or by their houses. There are few 'great open spaces' here where you can't wave to someone every minute or two. At Bugac, met by retinue of cowboys. Got into the village waggons, two or three plus a driver, and away we went over the *puszta*. Jolted and all that. But great fun. Then we got to the place where we fed. Great preparations. Abundance of apricot liqueur and apricot brandy, very cheap. On the tables an abundance of wine. Announced that all the wine was free, but that coffee cost extra! A rush for the wine. It was very good wine, the liqueur was exquisite, and the apricot brandy very good, *tres bon, sehr gut*. All the dishes of the country, cooked their way: Soup, Chicken, Sweets, Goulash, Wine, Wine, Wine.

17 to 20 June 1937, Italy

17 June 1937

Again we passed through some hundreds of kilometres of fascinating country, rich, green, fertile, well tilled and cropped. No fallow. Grass

hay in abundance. Finally stored in high places, may be 20 feet high. We were not far from the Italian border all day, and at least three times we passed considerable numbers of armed mounted soldiers, with batteries and machine guns. These regions are troublous places to live in. The boundaries can never be fixed. England is fortunate, she has about the same mixture of races, but there are no boundary lines where one race may merge into another, or where doubt may exist. 'Around us indivisible the sea', as in Australia.

Noted the flat floors of the valleys and decided to write a paper on them. Lake formed. Saw two places, particularly one at Lake Dobiacco, where the whole process could be seen in progress. Shrines of all types very numerous. At times three close together, within 20 yards. Houses a bit different. Larger, better painted than Hungary. Brighter. They look very comfortable. I felt that I should like to live in one. Here in these Alpine fastnesses, where everything seems to be done as it has been done for ages, it is curious to see the power pylons striding across the land! The New and the Old. There was a vast amount of timberworking. Wood distillation. Sawmills in abundance. Water power. Valley of the Drave (Drau). Rushing waters everywhere, and it needs only a little channel to divert some to a water wheel and there you are. Village follows upon the heels of village. Churches, shrines, wells, and other villages lie higher on the hills where the woods have been cleared, or away across the fields where the valley becomes a little wider. An anti-erosion scheme on the cutting faces was made of plaited willows. These sprout and hold the soil. The fences are interesting also, no nails, strips of planks, two uprights tied with reeds.

18 June 1937

Forest, snow, and this type of house have been with us for a long time in Switzerland, Austria, Germany and Hungary, and now in Italy. But there are differences. I should love to get a book on these houses, and their differences from place to place. There is a general type of the mountain and valley peasant home, but the Swiss are far the most trim, the German and Austrian neat, the French the least clean and tidy and orderly, were it not for the Italians.

On the one side, what a contrast between the houses and villages and fields of France and Switzerland. And again now, what a contrast between those of the mountain villages of Austria and Italy. Then there are the churches, more numerous than the villages. With their different typical towers, and the extraordinarily numberless and varied shrines. Both these villages are Austrian, towards the Tyrolean (Versailles) border. As we got lower and lower the forests gave way to fruit trees and other

warmer trees, for we were coming to the Mediterranean lands. And at Treviso it was a garden. The long flat fertile plains from there south to Merazo and Venice are a miracle of fruitfulness. They are astounding; there is a riot of growth, but orderly, with rich soil, abundant water, and abounding sun.

The crops, three at a time—fruit (hard pruned) vines and roots or cereals or lucerne all at once. And the glorious long avenues of great-boled planes (sycamores)! It was truly a revelation, though I had seen already (though at another season) the wonderful flat lands of the Valley of the Po River farther west. So on we came to Venice itself. The approach is much more attractive and romantic than it was by rail [in 1931], for you can see the whole magic city there before you as you approach, towers and campanile and all.

20 June 1937, Milan

There is evidence of very heavy erosion, mostly kept in check by man, in the rushing streams from the Dolomites. The abundance of limestones in all these great mountains is a surprise to me. Not only in those made known (in analysis) by Monsieur Dolomieu. It was Sunday, but in many places peasants were in the fields, turning the grass hay that had got wet. Men and women and girls.

This evening I have written an article (for *The Australasian*) on the trip around the lake, so I shall not put very much here. White walls, blue water, vivid green trees, red roofs. It is most beautiful and romantic. The geology at Torbole is very good, also the obvious geomorphology. The abundance of limestone has much to do with the good roads and buildings of Italy, an important geological contribution. The western walls are steeper and are tunnelled for the roads in a wonderful way. We tore around some of these bends and through the tunnels in a hair-raising way. The circuit of the lake is 100 miles or more. All the roads are in limestone or dolomite. The upper road is newer and untunnelled. The cost must have been considerable and the engineering skill very great. All the tunnels are pierced every few yards to give both ventilation and a view of the lake.

22 June 1937, Grande Corniche

Just as I always hoped to travel once upon the Appian Way in Rome (which I did) so also have I always wished to travel on the Grand Corniche. Now I have done the whole thing from Genoa to Nice, under gorgeous weather conditions and very pleasantly. The mountains, good and high, come right to the coast. Try as I will, and I do try everywhere, I cannot get views of mountains, villages, roads, crops, etc. Plenty of

castles, and churches, and pleasure grounds, of man and his urban works but little of man and the country and his work there. Steep terraced slopes, facing the hot Southern sun. Vines abundant, with olives, figs, Mimosa (some blossoms, some dry pods). The rivers are sometimes dry, heavy with shingle always, but the majority had an outlet to the sea. Everywhere women washing clothes on the shingles of these aggrading braided streams, and it was quite common to see the women carrying home the washing on their heads. Here and there the patient ox in cart or plough, here and there a donkey in cart or with packs, here and there an ox and horse harnessed together.

First heavy limestones, I am astonished at the amount of limestones in these mountains, a most important geographical fact. Later heavy mica schists and schists generally. Then, very interesting, extraordinarily heavy conglomerates; Flysch, glacial, or heavy pluvial and coastal action due to overdeepening and rapid uplift of land? Often silicified. Here and there at a sunny small port such as Alassio there were holiday makers, speed-boats, ships, sun-bathers, regular rows and rows of them lying on their bellies on the sand. Savona seems to be an important coal port, small good harbour, heavy cranes, etc.

In addition to other crops there now were fields of trombones, asparagus, tomatoes, artichokes, potatoes, vines, figs, carnations. Plenty of Australian acacias planted at the roadsides, some kurrajongs, mesembryanthemum (like ours but maybe native), olives, figs, prickly pears, agaves, all the things that grow well with us in South Australia. Also albergos, ristoranti, pensioni, castles on peninsulas and islands, relics of the 'good old days', when 'they might take who have the power, and they might hold who can'. Must not forget the fields of castor oil plants. There were the usual strange old churches looking as old as Time, thick stone walls, close green shutters, iron gratings on all first (ground) floor windows. Some gum trees, some tamarisks, sheoaks.

24 to 30 June 1937, France

24 June 1937, Nice to Grenoble

We were on Napoleon's route of his return from Elba in 1815 all day. We came to most astounding country. Was it Jurassic? Valleys in synclines. Two formations, one capping the hills, and resulting in some of the most striking and bizarre forms I have ever seen, on a huge and magnificent scale. Castellane with its great rock, musketeer legend, church, vermouth and cognacs were very good. Digne, good also. At Digne Napoleon reformed his troops. Met Louis. Poorer valleys, smaller villages, dingier chateaux. Sisteron, very old, with the great braided

Durance. Saw wild geology along the old French-Italian boundary. Got out, picked Salvation Jane, wild chicory, and lavender. Magnificent gorges, narrow defiles, huge rocks, briar roses, dwarf junipers, like the scrub of Santa Fé. Then came snow peaks to the east and high needles and crenellated tops to the west and broad fertile villaged valleys between. Always perilous clinging roads. Huge river terraces, mighty ones. And so, with interest and conversation and speculation we came on to Grenoble.

25 June 1937, Dijon

A remarkably enjoyable journey and much memorable geology, physiography, villages, statues, crops, trees, and famous towns and cities. I was sorry to leave unmentioned all we saw at the charming and historic old town of Grenoble, with its Roman wall and its Revolution declaration of 1788, and all that. Left Grenoble early, cloudy and dull, but cleared up to a fine sunny day, except when we climbed above the clouds on the High Jura Mountains, north of Geneva, and got into cold and fog and wind once more. The scenery and human geography of Savoie and Haute Savoie were very fine. High mountains, dense forests, serrated snow mountains, Belledon Range, to the east, deep gorges and defiles, with miraculously high bridges. Wide valleys and pleasant slopes with the characteristic French culture of villages, vines, crops, people; grapes, wheat, beet predominating.

Then borders, *douanes*, passports, etc and we were in Switzerland. Distinctly unlike German Switzerland and Italian Switzerland. This remarkable country is just the most mountainous valleys of three separate countries, and the peoples keep their own languages and customs with the laws, peace and prosperity of the one. Then Geneva, very beautiful, and the statuary and the League of Nations buildings.

Then out and away after a lovely lunch high above Lake Lucerne with Mont Blanc dim in the far background. Across a fertile plain and rising upland into the barrier mass of the mighty Juras. 'Scythe and hoe culture'—the phrase I coined for it. Up. Up. Up, till we crossed the Pass des Fantilles at 1323 metres, about 4000 feet, which we had climbed in half an hour. Down and down—different people and occupations, but much the same. The charming old towns of Champagnolles and Poligny, where we strolled a bit, then Dole, where Pasteur was born, and now we were out on the wide fertile plains of the Cote d'Or, where we had five years ago travelled across in the train by night. And so through all these miles of beauty and interest we came to Dijon, the chief city here, with its churches, monuments, arch, soldiers, fortresses, mustard, cassis and chocolates.

30 June 1937, Paris

Professor A. Lacroix is old, tall, impressive, with a cast in one eye, and a long white beard. He speaks some English and with a word or two of French we had a long and fascinating conversation. I have now known or met all the most famous workers on tektites. I gave him a flanged button. He gave me a beautiful collection of Indo-Chinites, from five separate localities and types. And he gave me his last paper on Indo-China and the Ivory Coast, and he asked me to write him a few lines, with my signature to add to his collection of signatures of 'famous mineralogists!' His assistant, an excellent man, with good English, showed me through the collections. Saw where he had melted Darwin Glass and Indo-Chinites and made new tear drops out of them by gravity. The Indo-Chinites are wonderful. Very large and with wonderful regularity of form compared with what I had thought. I was permitted to handle the largest ever found, four kilos, and was given a fragment. I handled also the treasured two specimens from Columbia, South America, which Professor Lacroix thinks are not tektites. But I do not feel convinced he is right. They are so like them. Water-clear, nearly, when looked into. Sub-spherical and pitted. Saw also the astonishing Ivory Coast tektites, undoubted!

Among the meteorites was a whole case of 'seen to falls'. No rusting. Many chondrites, some moulages, beautiful widmaustalten figures, one the best I have seen. Their largest iron meteorite is from Touat, Sahara, 500 kilograms. Saw and handled poires, larmes, sphères, ellipsoïdes, disque baguettes, plaques, and bulles fazeuses. They show much of piezoglypts (thumb prints) and Monsieur told me that these were to be seen also microscopically on exploded grains of gunpowder. And so I left Professor Lacroix with much understanding and goodwill.

11-12 July 1937, Prague, Czechoslovakia

I was puzzled about the river. Peg suggested the River Moldau. Inspiration. Of course. Moldau. Moldavia—Moldavites!—the first of the Tektites. Next day I went too see the collection of Moldavites at the National Museum here; it was glorious. Two huge fine cases with seven long rows each, 35 large, well selected specimens in each row. Seeing them in the mass gives one a better and a different idea of their story. I have the characteristic types: but all these were fine large specimens. Although they are very far from being as regular in form as the Australites, yet there is a very definite series of form types. Those I have are quite characteristic. The amount of etching and pitting and erosion generally is notable and all the kinds of pits, such as one gets in other tektites, are here abundantly. There were three Australite specimens also, very poor; three of Darwin Glass, one Billitonite, four from Cambodia

and three from Annam. The Australites were from Lake Eyre. Among the Moldavites were the cusp shaped pieces of burst bubbles, irregular as in the Indo-Chinites, and much rarer than with the Indo-Chinites. I had a good eye-ful of these, and it was very good, indeed.

31 July to 20 August 1937, Holiday Trip to Spitzbergen

Comment by FF: So far their travel had been primarily to get from one place to another to work. The Spitzbergen trip was a well-earned holiday, on a ship called the *Stella Polaris*. It was also Father's first real experience of glaciation, of which he had, of course, learned, in theory, during his geology courses in Melbourne years before.

2 August 1937

It is now 10 am, and we have just entered the Norwegian coast. It is a miracle of newness to me. The landscape is different from anything I have ever seen. A low peaceful island, with its barren grey granite rocks, its white houses and churches, and red roofs, and small level green patches here and there where food is grown. There are no trees, not even a shrub.

It is the island of Karmøy, on our port side, near the north of the Boknfiord. On the starboard side are other islands and peninsulas of the mainland. These rocks are a very beautiful grey. In this broad morning sunlight a purple-silver-gray. The rock is bare, mossed, jointed, and worn, by aeons of sun and wind, and sea, and before that by ice and snow. It looks very old. Gives me the impression, purely psychological, perhaps also a little bit physiographic, of being the oldest landscape I have looked at. But it is, of course, new also, still in the making, but in such hard and enduring rocks, hard bare granites, the wearing down process must be very slow.

Bays, with deep water, natural harbours, large and small, are countless. These, as I see it, are the *viks*. From these cosy *viks* as hiding places and homes, the old Vikings emerged in the years gone by. I had known and read something of them, but I have now to learn how far afield they went, ruling over Ireland, parts of England, parts of France, and surprise of all to me, entering the Mediterranean, going up the Rhone, seizing Pisa, and besieging Constantinople (865 AD).

4 August 1937

Have watched the glacial physiography of the islands for a while. It grows more and more marked, more and more severe, naturally enough, as we are at the moment within half an hour of the foot of a retreating glacier. It cannot indeed be so many thousands of years since these islands

were covered. The sculpture is unmistakably different, all these bare granite faces (schists too, and dykes, all contorted) have been so evenly levelled off. The ice mass, with its grinding rocks, is no selector, or not much so, and there is less, much less, of that intricate selection of the softer or more erodable rocks, less differential erosion, less of the etching effect that comes with slow subaerial decomposition plus the work of running water, or the equally selective, but quite distinct, etching of hot sun, dry wind, and sand blast. Here and there, there are green grasses and small patches of soil, and a few trees, but they are something of the later effects of rain, sun, and air, and running water. Still, not much impression has yet been made on the original job done by the glaciers.

From the point of view of human geography, it still impresses one that houses and homes should exist on such bare and stony coasts. Most of the harvest must, in all cases, come from the sea. The big event today was the visit to the Svartisen glacier. It looks to be no distance from the water's edge to the glacier, but it is a long and rough and rocky path, through dwarf birch woods and over acres of glacial pavements, and huge moraine boulders and gravels. The crevasses and hollows in the ice revealed the most deep and wonderful blue. I climbed out upon the glacier surface, huge ice crystals, one inch cube average, and if I had not bought a spiked stick I should have slid all over the place, as others did.

A big river runs from the glacier to the fjord. The walls are steep, and apparently it is stronger in winter. Also, as at the Rhone Gletscher, one gets the impression of small misfits. The glacier is just a remnant, left in a valley built to fit a huge glacier. This one is of course huge by comparison with the Rhone glacier. But here beyond the Arctic Circle, where we have now encountered perpetual snow at sea level, one expects to see glaciers at their best, and they will doubtless grow bigger and better yet. For there is a long way to go.

Among the thousands of thousands of boulders there were only a small percent striated. I guess many boulders are carried and never get ground. The variety of folded schists, gneisses, marble, actinolite schists, Kyanites, etc was exhilarating. Got a better idea than ever I have had of the general scheme of glacial erosion, the narrow sharp ridges, the place where the descent starts and where erosion is most rapid. Above is the old peneplain, upon which the glacial period commenced. One pictures it covering all, and going on away across the North Sea to Scotland and England.

5 August 1937

There was beautiful evidence on the island beaches, for miles, of an old coast line 100 feet above present sea level, with wave-cut cliffs, etc. Practically all the settlement was below that line. The houses do not cluster, but are lonely and separate as a rule. Though they are wood, and look like English houses (or Canadian, etc) they are really thick-walled, of hewn wood, covered with pine boards. After lunch we came to Tromsø, on an island, quite a busy town, a town of fish and furs, fishers, hunters, etc. Salmon drying arrangements all about. Quite a lot of shipping. One sees more big ships at once than on most sea roads.

Lyngseidel has been a treat. Not so much for the Lapps' Camp, though that was remarkable and interesting. But because of the walk home, through green woods and pleasant fields, crops of oats and potatoes, nice homes, perfect blue fiord seas, blue mountains, indescribably beautiful, jagged and snow capped, not exactly capped, the peaks are free from snow because it is summer. But there are numberless glacial patches. The air, chill now we are out on the fiord again, with the ship bowling along, was mild and beautiful. Which shows what a breath of warm air can do—the warm air that comes from over the North Atlantic Drift. It is a remarkable climatic experience.

Saw also at very close quarters 200 of those small invaluable timid beasts, the reindeer. Very timid. High proportion with fine velvet antlers, many calves. As they run their feet click in a very curious way, click, click; don't know whether it is the joints or the hooves. Saw the papooses, with the epicanthic mongol fold more obvious than in the old folk. The broad cheekbones were marked, square heads, etc. Mongolian, Scandinavian a bit too. But living at a distinctly lower culture level than the Norwegians who have fine homes here, with electric light, abundant heat, gardens, radio, and all the comforts of the present day, except nearness to big centres.

6 August 1937, Hammerfest, Norway

Hammerfest, three to four thousand people, whose harbour never freezes—the most northerly town in the world. Naturally, it is a strange and fascinating place, with its narrow streets of wooden houses, sheltering along the narrow strip of low land at the foot of the cliff of metamorphics; fine schists and gneisses. The vast racks of drying fish, the houses, three storeys, filled with dried fish, a literal fact. Neat trim houses, sturdy fishermen, good shops, abundant souvenir and postcard places, a fine old wooden church with a good organ, good stones, an altar-piece of Christ helping Peter the Fisherman and other pictures of

hills and ice and heaven that were quite geographically appropriate. It is here that we are to have our week without night.

At about six o'clock we came to one of our chief goals, the great grim North Cape, Nord Kap. To the west there is a low peninsula of reddish granite, with a beautiful margin of intrusion into the schist, which is black. Beyond, North Cape stood up black and steep. The nearer peak is called Knieskjollen. We sailed beyond it and around to a sheltered bay on the lee side. Then the ascent of the Cape. In a steep chine or 'valley', a winding rocky path had been cut, very steep, with ropes here and there to aid one, and with wooden ladders over the worst bits. But the ladders were steeper to climb than the rocks. The whole climb was about 1,000 feet, 972 I think. And if you think that's not much, just think what it would mean to climb the Eiffel Tower, step by step, or the Empire State Building.

We landed. Peg came up far enough to get a good view. I pegged on. And by sticking at it, despite my age, indolence and obesity, I beat it. But when one got to the top the North Cape light (and restaurant) were far away. So away I went across the moor, real dinkum tundra, wouldn't have missed it for anything. An old mature land, almost a penneplain. But such a 'soil', such vegetation! It was a geographical treat. The soil was full of boulders, most peculiar and remarkable. Formed I think by freeze and thaw, freeze and thaw. Low vegetation, blueberries, grasses, mosses, peats, springy soil, but everywhere full of stones, an utterly new physiographic phenomenon to me.

16 August 1937. Gerainger Fiord, Norway.

We have had a wonderful journey into a strange wild country—high bleak desolate glaciated Norway. Five of us, of a party of 150, in motor cars, with excellent drivers, travelled for the whole day in these uplands. First through the wild, narrow, and beautiful Norangsdal Valley, past the lake caused by a rock avalanche, and the ruins of the buried houses still visible, up past poorer and poorer homesteads, in country where one cannot imagine that man could make a living. Peat bogs and peat digging. Glaciated rises and massive moraines. Small pine forests, birch and beech. Stunted woods, then mosses, bogs, peat, and morasses, but always berries and wild-flowers.

We had three stops on the journey, all at good viewpoints; Visnes (morning lunch), Videsaeter (lunch), and Grotli, high up in the snow country for afternoon coffee. Finally of course, beautiful Merok, one of the loveliest imaginable of places, source of half the drop scenes of the theatres. We must have been up 5000 feet or more, in the country where

the treeline goes only a few hundred feet above sea level. Roads that wound up like the Furka and Grimsel Pass Roads in the Alps, but Peg and I thought them higher and steeper. The whole scenery was alpine, and yet totally different. For it was all in these massive schists, gneisses and granites. One huge scale impression is of the barriers several hundreds of feet high that the old glaciers rode over, smoothing and glaciating rock surfaces at all angles.

I have acquired a wonderful lot of knowledge, that can only be got by seeing, about glaciers, first in the Rockies, then in the Alps, then in Spitzbergen, and now again in Norway; about the way glaciers do their work, the long low valleys and then the line, somewhat marginal, of abrupt descent, and the economic impact of that. Glorious rock basins with alpine lakes, glacial-gouged, we saw in plenty. Bare bleak rock faces where not even mosses and lichens grew. Vast moraines. Upland moors, etc.

17 August 1937

Just before dinner a young American came and asked me if I would give a lecture on the 'Geology of Norway and Spitzbergen' to the young folk on board, in the forward lounge, starting at 10 o'clock, at which time the ship left Balholm. I agreed. So they provided a blackboard and chalk, and I took my glacial boulder. At 10, when the usual three cannon shots announced our departure, I gave my first sea lecture. Quite a good audience, and a good number of questions at the conclusion. So that I was answering questions to a late hour.

It has been fine seeing this naked and unashamed physiography of Norway, with the unique chance, as we went north to Spitzbergen and the polar ice, of having the same experience as if one stayed here in the south and went back in time, for tens of thousands of years, to the various successive stages of freezing. Spitzbergen is almost completely glaciated, but not so much so as Greenland and Antarctica; and Norway must have been as deep under ice as central Antarctica at one time. The naked schists and granites have huge crevices, master joints, faults, and thrust planes. These are *always* occupied by streams. Most interesting. One guesses this in soil covered places like the Mt Lofty hills. Here it is clear and obvious. One sees the elements of physiographic development in a wonderful way.

The other point that is fascinating in these valleys is the rhythm. Fundamentally, maybe, this rhythm depends upon the regularity of the occurrence of master fissures. Therefrom comes the rhythm of streams, of talus slopes, of bastions, of peaks, of fiords themselves, and there is

a rhythm of glacial lakes and (coming to the realm of geography) there is a regular recurrence of fertile flats, and therefore of villages, of schools, and so on. One gets an idea too of the whole great scheme of continental glacial erosion, the 'push' of the vast snowfields, the point or line where fiord making starts, the influence of 'plucking', which is most important, the headward erosion of glaciers, the concentration on the valley, and the consequent profound deepening there while the upland is not so greatly changed. In many ways the river cycle is paralleled, yet different.

2 to 7 September 1937, Great Britain

2 to 3 September 1937, Nottingham, BAAS Meeting

Got a note that I was on the Section C (Geology) committee, and I believe I am now on Section E (Geography) committee also. Met Dudley Stamp, who had very kindly had me elected a Vice President of Section E (Geography) and asked me to their Section Dinner on Monday evening as their guest. Since I last saw him, he has visited every country in South America, and (at invitation of USA) inspected every state of that country, and (for British Government?) has inspected Nigeria re soil conservation, and who has now been invited to visit and report on the mapping of India and China. He is a smart fellow, and an indefatigable traveller. But I fancy it's a fine thing for an ambitious man if he has the good fortune to live in London and has the further good fortune to have so influential an uncle as Sir Josiah. We talked of world geography and of Australia's north and soils, and soil utilization, and culture patterns in England. He stresses (as I have lately in these notes) that the land pattern of England is something that has evolved through 2,000 years of struggle between man and nature, roads, rivers, products, traditions, and cannot be lightly set aside by the whim of thoughtless 'town planners' who have never allowed these things to enter their heads. And he spoke of opening up the waste lands of the world, and of us in Australia having to give Australia to Indians. And I said *Cui Bono?* If lands are productive, population increases, and the pressure becomes as great as ever. Why should we try to fill up the earth with struggling people. Look at Fiji. To whom the good? Why indeed should we try to increase the world's population at all?

Professor Fawcett (London) gave his Presidential address on World Movements of Population. He stressed the fact, and supported it with unanswerable figures, that the Southern Hemisphere could never be of any great importance in world history. Have often stressed to my students the same thing, based on the same facts, but presented differently. He brought out many other remarkable facts about world tendencies in

population. It was a very fine effort, indeed, one of the best I've heard at any time.

I am just back from the Geography dinner. A most excellent and pleasant meeting. I was seated by the President as an honoured guest, with Mrs Haile, wife of the Trent waterworks engineer, who has made all those wonderful flood models, on my right. And Mrs Roach, sister of Brigadier General Winterbottom, who has had charge of surveys all over the world, on my left. Both were very pleasant and we talked freely so that the hours went by without noticing. Next on the left was Dr Bewes, of Natal, South Africa, who has written a geographical book that I must get hold of. Next on the right was, of course, Professor Fawcett.

Fawcett, London, is a very fine man, and I have told you of his excellent Presidential address. Opposite was Dudley Stamp, who has written geographies of all the world, and all its countries. We talked of possible Land Utilization mapping in Australia. He it was, I suspect, who gave the President material for the remark in his speech of the quiet-spoken man from Australia whose books they knew and who had lately travelled 35,000 miles at the rate of 150 miles per day. A bit of a stretch of my figures. Just before I left a young man of the London University came up and said he must meet me, as he gave two lectures every year from my books! And, in general, everyone was very friendly and nice. Saw Stevens and Maclaren to say goodbye. General Winterbottom is the most charming fellow, fine after-dinner speaker.

3 September 1937

I knew the day and date to-day. It was imprinted on memory as August 5 was in 1931. This was the day set down for the delivery of my paper on Australites to the British Association for the Advancement of Science. How far that little hobby of mine has led me! With no special knowledge or ability to deal with the problem at all, but just because I was so intensely attracted by the puzzle of them that I wanted to interest other people in the problem and so try to find out all about them. And now I have presented papers on them to four different scientific societies, in South Australia, Australia, America, and England! And it all dates back to one evening at our little Science Club in Ballarat when I gave a popular talk on them!

The Presidential address in Geology was 'drooled on' (as Skeats put it) far beyond its time. Then my paper came. Late. He asked me to be as short as I could and I promised to stick to my slides alone. Which I did. But everyone seemed very interested and appreciative and so I didn't think any more of time. Took my half hour and a bit more. So that the

two succeeding papers were very cramped. Still, they were not of such general interest as mine, which should have been given more time. Felt a bit self-conscious about my pronunciation, for the first time in my life, and especially tried to avoid the word 'Austrylia'. All my jokes went off very well. I feel from what was said that they are prepared to accept cosmic theory. One commentator drew my attention to the fact that Professor Pickering, in the *Astronomical Journal* a few years ago, had advanced a theory that the tektites were formed when the moon was torn out from the Pacific Ocean. Must look that up, and include it in future publication.

Then Dr Fritz Paneth, a very charming and brilliant chemist, works on meteorites, etc, helium content, and the age of the solar system, etc. He is now in London, an exiled Jew, from Königsberg. Seems a rotten shame to turn him away from Germany. Well, he had seen my name and paper, I had met him in London in 1931, and he came over from his Section. Asked me to dine with him at his hotel, which I did. And we had a long and valuable talk on the possibilities and probabilities of the arrival of the Australites.

In case there might be someone on the trip to-day (4 September) who was interested in tektites, I took a pocketful of choice specimens with me. At the first stop a gentleman came to me, asked a host of questions about them, wanted to see them, and had some interesting suggestions to make. He sat with me then and continued the talk. Turned out to be Dr E. B. Bailey, FRS, Chief of the Geological Survey of Britain.

Next stop another gentleman tackled me on the same thing, even more interested, and with more suggestions to make. His wife also was very charming, and knows quite a lot of geology. He was Sir Lewis Fermor, OBE, FRS, late Chief of the Geological Survey of India. Referred me to two papers of his, of which he has no reprints left, one on the 'Origin of Meteorites', *Journal of the Asiatic Society of Bengal*, and another on 'Garnets as a geological barometer', *Records of the Geological Survey of India*, both about 1911–12. He has a theory that explosive (deep) earthquakes, and isostatic balance, and basalt production can be explained by the alternate solidification and fusion of garnets. Most attractive. Remember most of it, but won't record it, as I hope to find it in the journals he speaks of.

Next came the President of the Section, Professor L. J. Wills, of Birmingham University, who is interested and wants some for his museum. Promised to send paper No. 2 to Professor Tilley, and Professor Paneth, Cambridge College of Science. Various other people also were interested including a man from Leicester University Museum who wants

some specimens. Oh, and also Dr Rudolf Richter, the *Universität*, Frankfurt am Main. He was very keen, and we had long yarns. He asked if I should mind him publishing a popular article in one of his journals on them, and including some of the illustrations from my papers. Since the object of my reading this paper was to try to convince English geologists of the interest that lay in Australites, and more so of the fact that they must be accepted as of meteoritic origin, it was pleasant to have several of the folk refer to them as 'those meteorites'. Mr I. S. Double, of Birmingham, was also keen on them.

7 September 1937, London

Decided to go down to the Museum at South Kensington, and see whether I could get a copy of Darwin's Australite. Saw Dr Key, temporarily in charge. Nice fellow. Glad over a new mineral from Cornwall, a Bismuth Template!—fancy a new mineral from Cornwall at this late date. Then we saw the new tektite collection. Most beautifully set out, with my Shaw collection stuff duly honoured. Colombian tektites also, and I saw all the original Wabar silica glass blebs etc. Had a general good inspection, under Dr Key's direction, of all the tektites and meteorites. Went down to the crypt, and was given two casts of Charles Darwin's Australite. More important still, I saw and handled that classic object, the first Australite recorded. Around the inner margin of the flange is some of that red stuff that has not yet been analyzed, but which may yet help to solve the problem of origin, it may have excess of the original metallic content of the speculative parent meteorite! Somewhere in these notes is recorded the first brain wave I had to hunt up Darwin's Australite when I got to London, and to interest folk in them from that focus. This has been successful beyond my anticipations.

South Africa

24 September 1937, Cape Town

Of course, one always leaves out the really important things, the striking moments, and records the trivial. One BIG thing was the first sight I had of that great grim grey-purple precipice that is Table Mountain. It was just a glimpse caught over the top of some railway carriages, but that sight and memory will probably still be with me when all the other things I write of are forgotten.

Mr Sisson Cooper, the Manager of the *Cape Argus*, asked me to lunch, and he placed a beautiful new Buick car at our disposal for the afternoon. We did most of the journey through magnificent mountain, coastal, and fertile valley scenery. And so one gets comparisons and contrasts and

we had a good South African (English-born) chauffeur who knew the country, and one learns (with prior reading) something of local ideas and local values. For a good part of this trip the road (convict-built) was cut in an incredibly steep cliff face, possibly thousands of feet high in places. Geologically a treat also, the ancient peneplain of grey granite as clean cut as possible and the red sandstones laid down on those. We saw the Cape itself very well and the marvel of Table Mountain, and the miracle of the Table Cloth, which is not just a dead mass of ordinary level cloud lying on top, but is an ever moving fleecy cascade coming over the top and flowing down and disappearing at a certain level.

25 September 1937, Cape Town

Several times I have thought of all the things Dad told me of 'the Cape', which he visited on his way to Australia 70 or more years ago, and of which he often spoke—particularly of the black men who had such 'long arms'. Noted today the prevalence of things we have from here in Australia, such as Cape Weed, Cape Broom and South African daisies, etc. On the other hand one might go for miles here through wild wattles and gumtrees and imagine one was in Australia. But there is more variety on the Cape Peninsula than anywhere I know in Australia, because of the tremendous contrasts of mountain, cliff, coast, plain, and valley.

26 September 1937

Have had another magnificent drive, in quite a different direction and much interesting experience of South Africa. Mr and Mrs Hemer, with Cynthia at the wheel, called for us at 2 o'clock. We set out north this time through Milnerton, then turned sharp east toward Paarl and Stellenbosch. The whole way across the sandy flats and the low rolling sandy hills that separate this part from the Hottentot Holland mountains was covered by wattles in bloom. They call it Port Jackson mimosa. And abundant eucalypts, largely sugar gums *Eucalyptus corynocalyx* and blue gums *Eucalyptus globulus*, and pines.

Went first to Stellenbosch, a most interesting town, with its *sluits* and valves along the streets, and old Dutch appearance—the home of the Stellenbosch University—the Dutch (Africaans) University of South Africa. In a rich moist valley, lying among high crenellated mountains. Then we drove further on into the mountains, the Drakenstein mountains, and Simons Berg, to Helshoogte. Had tea there, coloured girls, at a Dutch farmhouse tea rooms on a beautiful *nek*—or col, with a view down into deep and beautiful valleys to both east and west. Then we went further on, on until as a matter of fact we couldn't go any further. We were at the home in the V of the mountains, that rose like purple precipices all

around, the farm of Mr Buller. Lovely Dutch home 150 years old. Friends of Hemers. Saw his vineyards, and hot-houses and proteas and bulb acres, and heard of the baboons and leopards that he shoots on the farm, 16 in one morning in the oaks at the house—baboons. With the bodies they trap leopards. Mr Buller is a fine old gentleman, and it was interesting to see the inside of South African farm conditions here. 49 inches rainfall. It was so interesting that it was nearly dark before we set off for home, and some miles of bush track.

27 September 1937, Cape Town to Johannesburg

On the 'Blue Train' between Cape Town and Johannesburg.

The level-bedded rocks, with their characteristic arid erosion, look like the ruins of forts and castles. Even here there is an occasional small lonely cemetery, testimony of some battle of the past. Near the line, or not so far away, there is usually some river or stream. About here, in the gathering gloom, the soil is everywhere dominantly yellow, such soil as there is. And in the *kopjes* one sees the remains of an earlier peneplain. There are some remarkable erosional effects to be seen.

Mud huts, goats, and donkeys, very rare. Like the half-breeds' huts on the Colorado desert. Here in the stony desert is a most remarkable thing: a Botanic Garden! The Whitehill National Botanical Gardens—the Karroo Gardens. All the Karroo plants. So that now we are really out upon the Great Karroo. I watch interestedly for Dwyka, and recall the indomitable E. J. Dunn, who did so much to discover and explore the famous Dwyka conglomerates! In a cutting I saw rocks very like varve shales. Also thought I saw glacial boulders along the base of the netting wire fence.

28 September 1937

Looked out upon a vast, rolling, dead khaki coloured landscape. My God. South Africa. Passed close by to the Modder River and Paardeberg! One sees more of the little forlorn and neglected cemeteries. How these all bring up memories of 37 or so years ago. And the 'purple patches' of the Boer War and Kipling's South African war poetry, and my 17-year-old mad enthusiasm for the flag-flapping jingoism of those days. How well I was led, with my fellows, by the well arranged public opinion propaganda, sending off our fine Australian boys to help England smash this little handful of Boers, in their own country, in what everyone now recognizes as a thoroughly unjust war.

29 September 1937, Johannesburg

Went to the Mines Department and saw Dr L. T. Nel, assistant director of the Survey, most obliging. Long and interesting talk, but not enough

of the geology and physiography of South Africa. He gave me a full series of maps and books covering the geology of all South Africa, for me to read on the ship. Have had a go at the maps already. He is Dr Malherbe's brother-in-law. Here also I saw some of the most beautiful aerial photographs, and the way they make them 'come solid' with mirrors, and the way they interpret them on to maps for geological base maps. A miracle. It is almost as good as the American Geological Society's work on Alaska, but with a cheaper plant. The photos are about one foot square, are immensely superior to our Australian military aerial photos, and are on sale by the Aircraft Operating Company, 23 Rogers Street off Booyesen's Road, Johannesburg. Might get the University to buy a few for me when I get back.

1 October 1937, Johannesburg

I shall be for ever grateful to Fate that I decided to stop off on our homeward journey to see South Africa. I am specially glad that, having done so, I was able to come to this marvellous city of the champagne air, the City of Gold of the world, Johannesburg. And, having got here I thank the Fates for having handed out to me such a day as today, for these reasons:

First. I have walked the streets of the wonder city where East meets West, and where the Magic Magnet of Gold has attracted the brains and energy of the most adventurous citizens of the world. Here on the High African Plateau, more than a mile above sea level.

Second. This morning I have been down the richest of the mines of this richest treasure house of nature that has ever been known, and I wandered in the stopes, east and west along the Reef, 850 feet below sea level.

Third. This afternoon I have flown over the city, over 2,000 feet in the air, seeing the reef from east to west, more than a mile and a half above sea level. What a day!

I will elaborate on the second and third adventures. I went down the shaft of the Crown Mines for 3,500 feet, and then down another shaft for a farther 3,500 feet, total 7,000 feet, which is 850 feet below sea level. I saw and had explained to me the whole great business. This mine has an area of over 40 square miles, which means a solid 60 or so square miles of payable continuous reef, dipping gradually and consistently south at an angle of 30 degrees. The manager's job is to take this out and put it through the stampers, the mills, and the cyanide plant. They do this, losing only .02 dwts [pennyweights] of gold per ton which goes to the dumps, and helps to pave the streets of Johannesburg. They crush

350,000 tons per month, pay 100 per cent dividends to their shareholders, give work to 25,000 natives and several thousand whites, and treat their manager like a prince and their staff like lords. I wish I had the time and pen to tell of the impressions of going down these depths, the casual men in charge, the winding gear, the ubiquitous natives, the marvellous ventilation system and its efficiency, the beautifully organized haulage system, the pressure on the ear drums, the fact that at top the descent is 3000 feet per minute, the feeling that you are moving up again when the skip slows down, and so on. I forgot to say that before I went down I was introduced to the General Manager, Mr A. V. Lange, and we talked for some time, looking at the coloured plans and sections on his walls, about the geological structure of the reef, etc.

Practically the whole of the mining is done within the reef itself, so there is no waste effort mining and hauling country rock. The whole of this is a most stupendous geological miracle, nothing comparable to it anywhere in the wide world. I got a full idea of the mining methods, the hauling and the ventilation. At that great depth I saw the natives drilling in the stopes, angle holes 42 inches long, 18 inches deep from the surface. The gold is not in the pebbles of the conglomerate but in the pyrites and silica of the matrix. At 7,000 feet the air was as fresh as at the surface. In places it was warm, but not so much. 2,000 feet lower the rock temperature was 103 degrees but they are cooling it down in an ingenious way by ventilation so that when they come to work it, the temperature will be about 93 degrees.

On this mine they have I think 19 shafts, used for various purposes, and they haul from three. An interesting interlocking system of chutes and bins and inclined shafts and electric trains and eight-ton trucks provides for a haulage system comparable to the train system of a city. Then we came up, and went to the roaring stampers. Then another mile or two to the cyanide plants. No, I forgot. Then to the ball mills, where the 'balls' are larger pieces of the banket itself, a most ingenious idea. We also saw the picking belts and the crushing mills for the larger pieces.

Then to the *sanctum sanctorum* where the gold is poured. Luckily it was the pouring day, and I saw thousands of pounds worth of the red-green fluid gold poured out. And I saw 15 great ingots, valued at more than £15,000. And lifted one, which would not be easy even if one did not have rheumaticky hands.

Lastly, my flight over Johannesburg. It was to have been in a seven passenger cabined Junker, but the pilot was on leave. Would I go up in an open plane, a Moth? I was quite comfortable and immensely thrilled and astoundingly interested in all that was set out below. The chief thing

was the mines, the cyanide plants, the dump heaps, the numberless gum-tree plantations, the winding streams, and I could detect those that flowed off to the south and the Vaal and the Atlantic, from those to the north and into the Limpopo and the Indian Ocean. I flew right over the Crown Mines shaft, over 2000 feet in the air, and saw the spot where I had been this morning down to 850 feet below sea level. Was that not an experience for one day!

Then there were the towns and gardens and race-tracks and kaffir 'locations', and grass fires, and some most beautifully sculptured hills and valleys, with their southward dipping Rand rocks. And from the air, in open fields, as you know, one sees all manner of curious things that date back to the long past. And I speculated on some round marks that I thought were maybe the sites of kaffir villages, and others that seemed to have been the homes of animals, for here not so long ago the baboons barked, the lions roared, and the wonderful animal life of Africa flourished. As I looked at one side and then the other, and was now and then delighted to recognize the true significance of some strange marking, I now and then also lifted my eyes to the far horizon, where the brown veldt stretched away to interminable distance in a hazy horizon. And maybe I thought that was the best part of the flight. The best physiographers and geologists (and engineers) of the future must be aviators as well. It is not enough just to go up in a flight. One must be able to fly often and wherever one wills. There was an extraordinary and unexpected number of dams and reservoirs, and always there was that impressive line of white heaps, the Rand, the mines where all the energy and science and skill of engineers and chemists and geologists, and all the effort of tens of thousands of black men and white is concentrated on bringing together into yellow bars the fine gold that is minutely disseminated for over a mile in depth through that vast series of rocks.

8 October 1937, Cape Town

'These are the last sad days.' Driving home with Professor Young, wise in his old age and tolerance and his many years of Africa, I asked him what was the future of the whites and coloureds here. (Coloureds are Hottentot-bushman-Malay-white crosses.) He said: 'In 300 years there will be no distinction between white and coloured.' I believe that this statement, made public here, would bring down the most profound public indignation on his head. He said he based his belief on the exceptional 'coloured' folk. Some of them were cleverer than their fellow whites, and of more value to the community. There was a coloured man in Transvaal. They wanted him to go for Parliament. There were

objections. It was said he was the cleverest man they had with figures; they needed such a man. He stood, got in, and was the first Minister of Finance in the Union Parliament. (His son was put off a train in Natal for being a coloured!). Then there's Dr Abdurahman, who is the smartest man in the Cape Town Municipal Council today, an Indian 'coloured'. Then there was Brink, who became De Beers's chief diamond expert and valuer, no white could touch him. When he retired the Cape Government took him on as their diamond valuer, against immense social opposition. But he was the best man available. So there you are.