Introduction

An autobiography is an obituary in serial form
with the last chapter missing.
Quentin Crisp.

I would not claim this scribble to be an autobiography, but rather more a ramble through the inner recesses of my mind. Perhaps it should be likened to a bungee jump into the past, each trip down reveals a little more than the last. Sometimes almost forgotten moments are uncovered, which in turn lead to others. I find most easily, times of great joy and happiness, times of love and romance, times of wonder and exhilaration, and times of triumph and success. But also in dark corners lurk demons, which threaten to expose events that I would sooner forget. Times of anger, times of sadness, times of disappointment, and even times of despair.

This is a journey we all make at some time, but most fail to put into words. I do this for my children, so that they may know what my life was like, and what made me tick. I cannot promise to tell all my innermost secrets, even if I could remember them, but I will try to be honest, and show both my strengths and my weaknesses.

While attempting to write this history of my life, I find the choice of where to start very difficult. Logic says start at the beginning, but because memory can be so perverse, it may be more prudent to start at a time which I can remember in great detail. This is to ease me into the task of writing, something that does not come easily to my feeble talent. As a youngster I was not at all keen on the English language, and struggled with anything that required creative writing. How I managed to pass the School Certificate examination in English I shall never know. It must have been because I was very good at the technical aspects of writing, which helped to obscure the the lack of originality. The only essay that I remember enjoying writing, and getting good marks for, was one on the subject of 'The River'. I was however ticked off for writing what was more of a geographical account of the river Danube, plucked straight out of a geography textbook.

Because of this aversion to writing, I kept no diaries, and have few notes describing my work or my life. Most of what follows will come straight out of memory, and as such may paint a rosy picture of my life. Of course I cannot remember the fine detail after 50 years, but I will try to give an honest account of the main events.

I intend to start with my first day at work at Harwell in 1947, but before I start I want to explain how it was that I embarked on this choice of career.

As a child I had no interest in science, or anything else that I can remember. My early life is a bit of a blur, of which I remember very little. However, my first day at secondary school, at the age of eleven, is of special significance. This is when I was told that I would have lessons in Science.

The science teacher was Mr.Bendall, a dynamic man who inspired us all with his outrageous demonstrations. I think we learnt little formal science, but were entertained by a series of experiments which, I feel sure, were chosen especially to spark an interest in what could have been

a dull subject. The demonstrations were mainly to show the power of water, steam, heat, and electricity; but he did include a little chemistry. The most spectacular lesson was on the subject of explosives. We progressed from coal gas bombs in cocoa tins, to actually making a small quantity of Ammonium Tri-Iodide. This is a very powerful explosive, which when dry is so sensitive as to be impractical to use. Wide eyed, and no doubt with open mouth , we plastered this dangerous material onto the floor of the laboratory. When it was dry we were invited to walk on it, producing loud bangs!

It was a very sad day when Mr.Bendall had to leave after only one term. We thought that it was something to do with the war, but never knew the real reason. The next teacher was a very dull woman, who taught us nothing but biology for three years. Only in the last year, when the war was over, did we get a new science teacher, and really begin to study physics and chemistry.

During this time at school, I was influenced by three books, which I am sure changed the course of my life. I feel that they are so important that I will describe each one in turn.

(1)'The Boy Electrician' by A.P.Morgan. This was given to me by my brother Ron during the war in 1943, when he was in the Royal Air Force. I devoured every page of this fascinating book. It gave me a good grounding in all things Electrical, and was full of wonderful experiments and things to build. It was regrettable that my father, being a professional musician, was completely impracticable, and unable to help me in any way. It was my uncle Ernest (Bes) who, during the war, sought out and brought me the parts to make my first radio.

(2)'Chemical Elements' by I.Nechaev. This book was given to me, by my sister Kathleen and her husband John, in 1945 to mark the end of the war. It was the story of the discovery of the Elements, from Karl Scheele and Oxygen, to Madame Curie and her isolation of Radium. It was a superb story of real people, who made great discoveries. From this I learnt a great deal about both Chemistry and Physics. This of course sparked an interest in Chemistry, and my father did buy me a Chemistry Set for my birthday. I think that he lived to regret this decision, as the house was filled with unpleasant smells, and his peace shattered by the occasional explosion!

(3) 'Science News 2' A Penguin classic edited by Professor R.E.Peierls. This was a compilation of articles on the subject of Atomic Energy. All written by famous Physicists who worked at Los Alamos in the U.S.A. during the war. Their work resulted in the Atomic Bomb, the first of which was dropped on Hiroshima in Japan in August 1945. This, and a similar bomb which destroyed Nagasaki shortly afterwards, brought the war to a quick end. The book was published early in 1947, and was almost a textbook on Nuclear physics. It contained a variety of articles on: Radioactivity, Nuclear Physics, Atomic Power, and even how to make an Atomic Bomb!! The last item was included, I believe, to show that the principle was simple, but that the reality of manufacture would need a huge industrial effort, and an enormous sum of money. I believe that this book was the first time that such information was available to the public. All previous work was either classified, or published before the war commenced in 1939. It was indeed the only 'Textbook' on Atomic Energy at that time.

It is interesting to note that two of the authors: Rudolf Peierls and Otto Frisch were the first to realise the feasibility of the construction of an Atomic bomb. Early in 1940 they worked in an empty physics laboratory at Birmingham university, and set about calculating the size of such a bomb, and the energy that may be released. They did not have all the data to make this calculation,

(nor did anyone else) but they made an inspired guess, that the fission cross-section of Uranium 235 would be similar to its geometric cross-section. When they put this into the calculation, they were amazed to find that the critical mass of the U235 core would be quite small, only a few kilograms, and that the energy that would be released was awesome. Before this, even the most optimistic estimates thought that the mass would be in excess of 40 tonnes, and would be totally impracticable as a weapon. It is significant that it took many of the finest brains in the free world, and the industrial might of the U.S.A., over five years to bring this germ of an idea, to the dramatic conclusion which destroyed Hiroshima in 1945.

I read the book in the spring of 1947 and was inspired; indeed I could not put the book down until I had come to the end. I doubt if I understood it all at that time, but one thing was certain, that this is what I wanted to do; I wanted to be involved.

At this time the press was full of enthusiasm for Atomic energy, and many were predicting a 'new world' where energy was virtually free! This would solve all our industrial problems, and create a 'Utopia' where people would only work because that was what they wanted. The papers were full of reports that a small piece of uranium contained as much energy as 1000 tons of coal! At that time little was known about the problems, and cost, of constructing an Atomic power station.

There were also many who feared for our future, in a world where conflicts were common, and new weapons seized upon by untrustworthy, and often unstable governments. This feeling was no doubt inflamed by the book 'Hiroshima', written by John Hersey in 1946. This is a factual, and very gory, account of what happened after the first Atomic bomb was dropped. As a direct result some 60,000 men, women and children were killed, and 100,000 injured; and almost all of the city of 250,000 people, was destroyed by blast or fire. It is quite difficult for us to comprehend, that a large city could be snuffed out in a fraction of a second!

One may ask: Why would a group of eminent physicists assist in the manufacture of this terrible weapon? Of course not all did give their support, but the overwhelming driving force was that, if it were possible to make such a bomb, it would be unthinkable to be second. Much of the original work, including the discovery of uranium fission, had been carried out in Germany before the war. It is ironic, and perhaps fortunate for us, that the Nazi purges of the 1930's had driven away many of their top scientists. However, the Germans were working on the problem, with reduced efficiency and limited resources, until the war ended in Europe. The thought that Adolf Hitler could possess this weapon, was more than enough to drive the effort forward.

After the war only the U.S.A. possessed the ability to make the bomb. However, once this had been proved to be possible, it was obvious that any nation, with sufficient funds and resources, would feel obliged to add this weapon to their arsenal. The British government was no exception, and moved quickly to set up a research programme to this end. The Atomic Energy Research Establishment (AERE) was founded in 1946. A suitable site was found for it near Oxford, it was RAF Harwell, an airbase which had seen service during the war. The purpose of this facility was to undertake research into all forms of nuclear energy, which would eventually lead to useful power generation.

However, there was no doubt that the primary objective of AERE, was to determine the quickest way of producing fissile material for the core of a nuclear weapon. This was divided into two possible avenues: (1) The separation of the light isotope U235 from natural Uranium. And (2) The production of a 'new' element, Plutonium, in a Nuclear Reactor.

If all this seems a digression, just understand that it is to set the scene in which I found myself, when I left school in the summer of 1947. I had obtained an Oxford School Certificate, which preceded, but was similar to 'O level' grades. However, one had to pass in at least five subjects, in one go, and this had to include English, Mathematics, and a foreign language, otherwise no certificate was granted. I disgraced myself in failing in French and History, but this was compensated by obtaining Credits in Science, Maths, and Geography. The failure in French was to give me much trouble in succeeding years.

Early in the summer I started looking for a suitable job. It is remarkable that at this time, I had no knowledge about further education! I had come to the end of the road at school, and had received no guidance from my parents, nor from the school. I did not know that there was such a thing as Higher School Certificate, nor did I know that it was possible to go to university!! All I knew was that I wanted to work in the field of science.

I was lucky at this time to find out that the Ministry of Supply was looking for young people to work as 'Scientific Assistants'. This was to be a new grade to get additional staff into an area where there was a shortage. The post was simply described as 'Helping scientists to carry out their experiments'. Without knowing what this really meant, I quickly wrote a letter asking for an application form. When this arrived I had my first taste of an almost incomprehensible 'civil service' form. After a long struggle, I managed to complete this, and dispatched it to an address in London. Within a week I had a reply asking me to attend an interview in Oxford in mid August.

In early August I went on a cycling and camping holiday with a school friend. We managed, with pedal power, to get all the way to Lands End and back in two weeks. I had not forgotten the interview, and re-read Science News 2 in spare moments during this epic journey.

On returning home, I only had a few days to prepare myself for the interview. When the day arrived I was quite excited, and caught the train from Reading to Oxford, leaving more than an hour to find the address. On arriving I asked the way to 'Carfax', and was directed to the centre of the town. I had a number, but it was one which I could not find. I asked several people, but everyone seemed to be a stranger in this town. After walking up and down the road for nearly an hour, I was beginning to get desperate as the time got nearer. Fortunately at this time I met a policeman who did know the address. I was standing just outside, but there were no numbers marked on the building. It turned out to be the rooms above Lloyds Bank. I entered with a few minutes to spare. The receptionist quickly checked my details, and ushered me into the interview room.

I certainly had not prepared myself for this. I was faced by five men, all in dark suits, and all looking very serious. The one in the centre started by going through my application form, and clarifying some of the details. He then began to ask all manner of strange questions, which had nothing to do with science. I answered as best I could, but I was a little bewildered. I was very thankful when he finished, and the others began to ask more sensible questions, mainly about physics and chemistry. They were very kind, but I soon realised that the policy was, to ask me more and more difficult questions, until I could not answer. Sometimes if I could not find the way, they would gently prompt me until I found the solution. When this happened they seemed quite pleased. After what seemed to be an eternity, one of the men, a plump man with a round jolly face, asked me what I knew about Atomic Energy. When I replied that I only knew what I had read in the Penguin book Science News 2, he positively beamed and said, if you know and understand that, you know

almost as much as we do! There was a pause while they all had a rather reserved chuckle, and I felt about six inches tall! They then started to ask real questions which seemed to be within the scope of the 'book'. I think I did quite well, and was very pleased that I had read the book three times. They did not probe too far, but seemed to be pleased with my answers. When it had all seemed to come to an end, the jolly faced man suddenly asked: If I had the material to make a fission bomb, what would be the greatest problem in its construction? I knew that there were many problems, and was not sure how to reply. I paused for a few seconds and said: Time! The time taken to assemble a critical mass! The jolly man looked pleased, but I thought that the others looked surprised, and perhaps disapproved of the question.

It seemed that the interview was over. The first man then asked me if there were any questions that I would like to ask. I said: Where would the job be located, and when could I start? This reply seemed to cause then some amusement; I suppose I should have been asking more mundane questions, such as how much I would be paid, and for how many hours a week. When they had stopped laughing, he replied that it would be at the Atomic Energy Research Establishment at Harwell, and if I were selected it would be very soon. He then explained that there would be some formality with paperwork, but that I should hear from them within a week. I think that I may have looked disappointed, for he quickly added: I think there is little doubt that you will be offered the position.

Ten days later I received a letter offering me the position of Scientific Assistant, in the Ministry of Supply, at a salary of 155 pounds per annum. I was requested to report to AERE Harwell on the morning of the 16th September 1947.

(It is interesting that the jolly man turned out to be Dr. J. V. Dunworth, a top member of the Nuclear Physics Division. I can only assume that he was there primarily to interview more senior candidates.)