

Dictated 1960

MEMOIRS - Leo Szilard

This is the first of four or five articles written for a national magazine. Start a new page.

I was living in Berlin where I was on the staff of the University at the time when Hitler got into office early in 1933. There was no immediate change but, rather, business went on as usual. While the Nazis were quietly reorganizing the government and getting ready for what was to come. I knew very well that this quiet will not last forever and my suitcases were packed - correction - and I packed my luggage, and I started to pack my belongings the day when Hitler became Chancellor. There were two suitcases packed in my room and I was ready to leave whenever things began to pop. In the meantime, I was marking time - correction - I did not give any classes during the term and I was merely marking time. It was during this period that I was touched by the first shadow cast by the Atomic Age. This first fleeting contact with the Atomic Age came about as the result of two accidental meetings. One of these was a meeting with a person and the other was the meeting with a book. The book was The World Set Free written by H. G. Wells in 1913 one year before the first World War. When this book first predicted the discovery of artificial radioactivity and puts it into the year of 1933, the year in which it actually happened. Wells describes how this discovery is followed by the release of atomic energy on an industrial scale, the development of atomic bombs and the World War which is fought with such bombs. London, Paris, Chicago and many other cities are destroyed in this War, which Wells puts into the year of 1956. In Wells' imagination, the first World War, the second World War and the third World War was telescoped in one. Wells saw

clearly, in 1913, how the world was headed for a war but he did not foresee that that war would come so soon.

New Paragraph.

At the time when I read this book, my interest in physics covered a broad field but I had no interest in nuclear physics. No one at the time saw any avenue through which atomic energy could be released on an industrial scale and neither did I. For me the book was a piece of fiction but a fiction which I found difficult to forget. The other encounter was with Otto Munzel. He was a Viennese of birth and when I met him a few years earlier, he was a wealthy timber merchant in London. His claim to fame, if he will be remembered at all, he will be remembered as the man who discovered H. G. Wells. At a time when H. G. Wells was virtually unknown, he caught Otto Munzel's fancy and Munzel set him to the task to publish his books in German. Whether he ever read The World Set Free, I do not know. When I met Munzel in the first few months of 1933, the world was under the cloud of the Nazi menace. Munzel and I talked about the possibility that the rise of the National Socialist Party in Germany might lead to another World War. There must have been many people at the time in Germany who were aware of this possibility and to this extent there was nothing unusual about our discussion, but at one point, Otto Munzel went off (dash) - at least so it seemed to me that he , quote, "I have been thinking about this matter for some time now," (end of quote) he told me, "and I came to the conclusion that if mankind is to save itself from a succession of wars which will be more and more destructive, it will have to embark on an enterprise which is capable of capturing man's imagination and permitting an outlet for man's

craving for heroic deeds. I know now," Munzel continued, "what this enterprise may be. The time is not far now when man may make an effort to leave the earth. It ought to be possible to build rockets powerful enough to overcome the gravitational field of the earth and to enable man to travel in space. There is nothing in history to show that man is capable of enduring a long period of idyllic life. To make a sacrifice, to risk his life, may well be an essential ingredient of human life. If there is no major - correction - unless mankind embarks on an effort on which those who want to make a sacrifice, those who want to risk their lives, can concentrate, mankind may well destroy itself in a succession of wars."

New Paragraph.

"This thought is new to me," I said to Munzel, "and I'm not certain whether I can accept your thesis but I'm going to give it some thought and this much I can say right now. If the time has come for man to leave the earth and, if it's true that this is what he must do in order to be able to live in peace, then all the physicists who agree with this thought ^{ought} ~~###~~ to turn their attention to nuclear physics. To leave the earth will take energy. Perhaps it might be possible to escape the gravitational field of the earth by using conventional fuels but it will hardly be possible to escape from the solar system unless we find a source of energy which is superior. --but it will be hardly possible to leave the solar system - correction - but it will be hardly possible to escape the gravitation of the solar system by burning conventional fuels; for this one would need the energy locked up in the nucleus. Nuclear physics has not been my field in the past," I said to Otto Munzel, "but perhaps if you really - if you convince me that we must make efforts to leave the earth in

order to find salvation, I shall change my field now and move into nuclear physics."

New Paragraph.

This conversation took place only slightly more than 25 years prior to the first Russian rocket which circled the moon. This just goes to show that when human imagination takes a flight and thinks that he should penetrate the future as far as thought can reach - correction - this just goes to show that when your imagination takes a flight and then you think that you have peered into the future as far as thought can reach and that you've got a glimpse of what the future may bring many generations hence, you might best have predicted what will actually happen one generation ahead or at most, two. Otto Munzel anticipated the future by one generation; H. G. Wells anticipated it by two. This just goes to show, etc. The conversation with Otto Munzel made an impression on me but I couldn't say that it was more than a fleeting impression. The World Set Free by H. G. Wells - H. G. Wells' book made an impression on me also. When I read H. G. Wells' book, I read it as a piece of fiction to which I did not attach any deeper meaning. Still, somehow, the impression which this book made on me was deeper than I knew.

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Perhaps because such an important part of my life evolved during the first World War, I had the tendency to limit my possessions to what could be held in two suitcases. I think I would have preferred to have roots, but I couldn't have roots I wanted to have wings and to be able to move at a moment's notice came to be important to me. Now that, for a second time, there was a major upheaval

in Europe (dash) - now that there was war again (dash) - I benefited from having wings and of not having roots. After the Reichstag was put on fire, I lingered for a few more days in Berlin. Having given up my apartment there, I lived in the Secretary House of Kaiser Wilhelm Institute in Berlin Garden (?), and was thus in close touch with the scientific community of this Institute. My colleagues found it difficult to bring themselves to believe that the Reichstag was set on fire on orders of the German Government. Germany has always been a very orderly country and setting fire to the Reichstag appeared to be a very disorderly thing. After a few days, having listened to all of my friends give their interpretation of the situation, I took a taxi - I locked my two suitcases, I picked up my two suitcases and drove to the railroad station where I took the night train to Vienna. I expected the train to be packed; (semi-colon); it was empty. There were Nazi guards on the frontier but they didn't bother any of the few passengers who were on the train. In contrast to this, the same train which reached the Austrian frontier one day later, was jam-packed. The passengers were asked to leave the train on the Austrian frontier and their luggage was searched and their purses were searched. Many were turned back and were refused permission to leave. All this goes to show that in order to succeed in this life, you do not have to be clever. All you have to be is a tiny little bit cleverer than most other people are. You don't have to know what the future may bring. All you have to do is understand what the future may bring one day before most of the others do. ^{As} a result of a chance encounter in Vienna - by the time the wholesale dismissal of professors of the Germans got under way, I found myself in London.

Insert. Note the following. In detailed story of London, relate

incident with Otto

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Continuation.

In London where I got involved in the work of the Committees who tried to place those who - the scientists and scholars who left Germany and came to England. This activity suited my temperament for I always found it easier to solve the problems of others than to solve my own problems. Since I had to start a new life in any case, I was considering to change my field in physics and perhaps to begin some work in the field of nuclear physics, but I always had been tempted by the mysteries of biology and I was also thinking of the possibility of leaving physics and moving to biology. If you live in an orderly society in peace time, it is almost - the social pleasures are such that it is very difficult for a man to change his field, even within physics, and even more difficult to change his field from physics to biology. But these were not ordinary times. Among the many distinguished scientists with whom I came into contact in England through my work, was A. B. Hill, a Nobel Prize Winner in physiology, who was a physicist turned biologist. I told him that I was tempted to move into biology and was relieved to find that he was not shocked. Quote, "If you really make your mind - if you make up your mind that you really want to do this, I think I can find you a position somewhere as a demonstrator in physiology. If you know physics, you should have no difficulty in reading up what you need to know in physiology and demonstrate it the next day, reading up one day what you need to know in physiology in order to be able to demonstrate it the next day." End of quote. I had not really made up my mind that I wanted to make the change. In the first half of this century, clearly physics was the king of the sciences. In the first half of this century, one major mystery after another seemed

to be cleared up and in 1933 the major discoveries were still coming fast. First the neutron, for instance, was discovered just a little while earlier, in 1932. No one had really suspected the existence of this particle just a few years before. It resembled in mass the nucleus of the hydrogen atom but it carried no charge. The nuclei of all other atoms carry a positive charge and, thus, they repulse each other. Because the neutron carries no charge, it is not repulsed by the nuclei of the atoms and, therefore, it is able to penetrate into them. On a this seemed to me a particle that would be fascinating to study.

New Paragraph.

Fortunately I was not faced with making an immediate decision for the German scientists and scholars, who arrived in droves from Germany, took my full time and attention. Because I have a one-track mind more than because of a lack of time, I even stopped following physics by reading - correction - I even stopped reading the articles in physics which appeared in the periodicals. But because of my interest in world events, I kept on reading the London Times. In the fall of '33, the London Times reported a speech given by Lord Rutherford at a meeting of the British Association in which Rutherford said that whoever talked of the release of atomic energy on an industrial scale was talking moonshine. that something cannot be done I've always found rather irritating because how can anyone know what someone else might invent? I was wondering about this while strolling through the streets of London. Walking along Row, I had to stop for a street light and the very moment when the light turned green, it occurred to me that Rutherford might be wrong because there might exist an instable element that splits

off neutrons when it is bombarded by neutrons and such an element could sustain a nuclear chain reaction.

New Paragraph.

With this thought in mind, I began to look at the various elements which might begin to look what element might be a promising candidate for sustaining such a nuclear chain reaction and the first element I hit on was beryllium. On the basis of the published masses of helium and beryllium, the beryllium nucleus ought to have been unstable and it could have disintegrated into two other particles and one neutron when hit by a neutron. I thought there might be other elements also which might be unstable in the same sense. This possibility intrigued me so much that I gave up the idea of shifting to biology and turned my thoughts to nuclear physics instead. I might have decided otherwise if I hadn't been alerted by H. G. Wells' book as to what the liberation of atomic energy on a large scale would mean. I also might have decided otherwise had it not been for the fact that just about that time discovered artificial radioactivity. If elements could be made radioactive by bombarding them with alpha particles as had thought, had shown, then why shouldn't elements be made radioactive when they are bombarded by neutrons? And if neutrons could turn ordinary elements into radioactive elements, then we had a tool, a very simple tool, which would enable us to discover the presence of neutron radiations. In science it is not enough to think of an important problem on which to work. It is also necessary to know the means which could be used to investigate this problem. I thought that I had an important problem on which to work and discoveries seemed to give me the means that I could use. As work with Committees who tried

to place displaced German scholars and scientists became less rewarding, I withdrew from this work and decided to mark time. I had a little money saved up, enough perhaps to live for a year in the style in which I was accustomed to live and, therefore, I was in no particular hurry to look for a job. I moved to the Strand Palace Hotel and started to dream about the possibilities which had been opened up by the recent discoveries in physics.

--brogate - to resort to partial abrogation of agreement in the case of minor violations rather than of being forced to choose between no abrogation and a total abrogation.

New Paragraph.

Pravda pointed out that the situation between America and Russia is by no means symmetrical and, income tax being in America what it was, an award of a million dollars would mean very little - correction - Pravda pointed it out that the situation between America and Russia is not entirely symmetrical. In America a million dollar award would mean very little, so Pravda asserted, income tax being what it is. This drew a prompt reply from the Department of the Treasury pledging that the award would not be subject to income tax. The Dolphins made no complete proposal at the rate at which the remaining legitimate equipment might be disposed of. Since the destruction of equipment which is listed and marked can be easily inspected, there was no major difficulty regarding the concealment involved in this issue. The major memorandum issued by the Dolphins dealt rather with the elucidation of the difference between controlled arms limitation and genuine disarmament. The difference lies, so the Dolphins pointed out, not in the amount of arms which are legitimately retained but, rather, on the purpose for which these arms are retained.

If these arms are retained merely as an insurance against the possibility of one of the other nations - against the possibility that some nation may secretly evade the agreement, then even a substantial amount of equipment retained is compatible with genuine disarmament. However, if the arms retained are retained for the purpose of making possible to prevent changes in the map by force or by the threat of force, then we are faced merely with controlled arms limitations, but not with genuine disarmament.

Start a new page. Call it "Last Chapter" and renumber the pages from here on.

In The year (dash,dash,dash)--- (Come in, come in, please.)