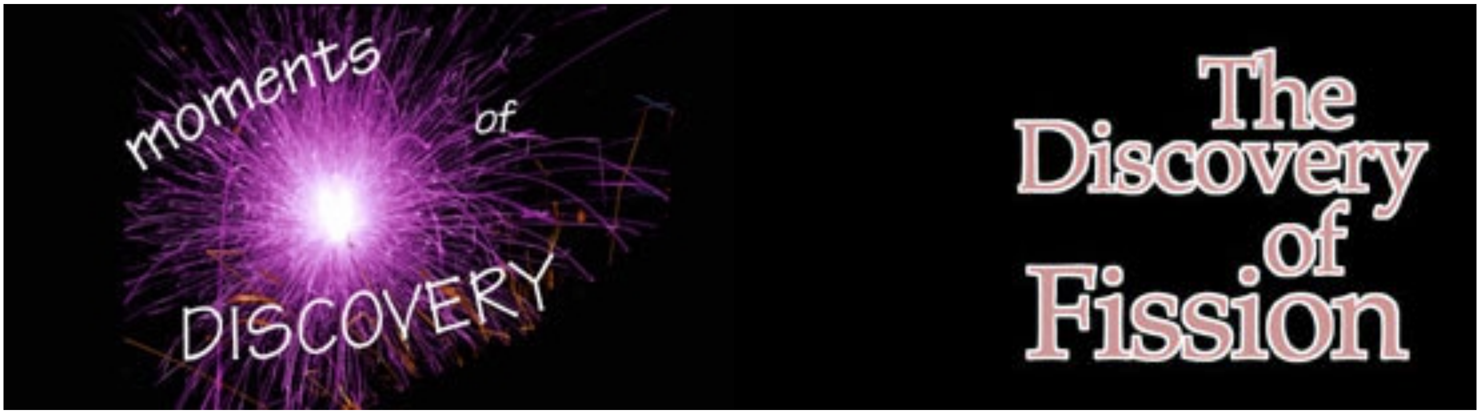


Enrico Fermi of ItalyNobel Prize winner and famous for creating the world's first nuclear chain reaction. Arthur Holly Compton of the United StatesNobel Prize winner famous for his discoveries about electrons and cosmic rays. Niels Bohr of DenmarkNobel Prize winner famous for his insights into the structure of atoms. Otto Hahn of GermanyNobel Prize winner famous for his discovery of nuclear fission.

The list continues: Einstein of Germany, Curie and Joliot of France, Meitner and Frisch of Austria, Wheeler and Alvarez of the United States. Most of them winners of the Nobel Prize; all of them superb scientists. An international community, joined in an effort to answer an ancient question—how does matter behave? A community that in 1939 came to focus on one narrow question—what happens to a uranium atom when a neutron hits it?

In the audio you can listen to these illustrious men and women describe the historic events which brought them to understand nuclear fission. You will not be listening to actors but to the people who actually made history.

This is a first-person account. It is not a physics lesson; you should not expect to learn all about the physics of nuclear fission. What you *can* expect is a better understanding of how science is done. This exhibit gives a glimpse into the scientific process, the lives of some renowned individuals involved in that process, and their role in solving a particular problem. As you listen and read, you will hear them describe themselves—their frustrations, their successes, their prejudices, their world view. They tell of how they related to science as human beings.

Can atoms be split apart? Does each atom have inner workings? Parts which can be separated? Parts which can perhaps be put to some use? These questions had already come to mind in 1898, when J. J. Thomson isolated the electron. That was the first solid proof that atoms are indeed built of much tinier pieces. Thomson speaks of the electron in this recorded passage...

Thomson: Could anything at first sight seem more impractical than a body which is so small that its mass is an insignificant fraction of the mass of an atom of hydrogen, which itself is so small that a crowd of these atoms equal in number to the population of the whole world would be too small to have been detected by any means then known to science.

Ideas about the atom were refined by one of Thomson's students, Ernest Rutherford. He showed that the mass in an atom is not smeared out uniformly throughout the atom, but is concentrated in a tiny, inner kernel: the nucleus. Rutherford wanted to understand the nucleus, not for any practical purpose, but because he was attracted to the beauty of its simplicity. Fundamental things should be simple not complex. Here is how he explains himself in 1931...

RUTHERFORD: The bother is that a nucleus, as you know, is a very small thing, and we know very little about it. Now, I had the opinion for a long time, that's a personal conviction, that if we knew more about the nucleus, we'd find it was a much simpler thing than we suppose, that these fundamental things I think have got to be fairly simple. But it's the non-fundamental things that are very complex usually. I am always a believer in simplicity being a simple person myself.

A young man working with Rutherford in 1911 was Niels Bohr. They created a halfway successful model of the atom called the Rutheford-Bohr model. They imagined a nucleus at the center with electrons orbiting around it. Twenty-five years later, Bohr described his collaboration with Rutherford...

RUTHERFORD

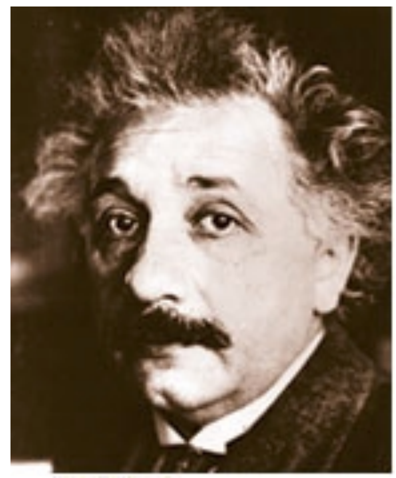
BOHR: If, twenty-five years ago, I had the good fortune to give a modest contribution to this development, it was, above all, thanks to the hospitality I then, as a young man, enjoyed in the famous laboratories of England. In particular, I think with grateful emotion of the unique friendliness and straightforwardness with which Rutherford, in the midst of his unceasing creative activity, was always prepared to listen to any student behind whose youthful inexperience he perceived a serious interest.

BOHR

To Bohr, studying the atom was a friendly pursuit of truth. The public was not so sure. Rutherford and other scientists had already happened to notice that energy is intensely concentrated within the nucleus. Newpapers began to talk about the chances of unlocking that energy. Reporters said atoms might run the world's industry someday, after our supply of coal and oil ran out. On the other hand, H. G. Wells wrote a novel featuring atomic bombs. The *St. Louis Post-Dispatch* in 1903 describes atomic energy...

NEWS ARTICLE: *"The most wonderful and mysterious force in the universe—the atom's power—will be inconceivable. It could revolutionize the illumination system of the world. It could make war impossible. It is even possible that an instrument might be invented which at the touch of a key would blow up the whole earth and bring about the end of the world."*

WALTON, RUTHERFORD, AND COCKCROFT



EINSTEIN

Most physicists ignored that sort of wild journalism. All they wanted was to get a better picture of the nucleus. One big step came in 1932, when Cockcroft and Walton, in Rutherford's laboratory, built a machine that could shoot a beam of protons at very high speeds. They fired protons, like bullets, into metal targets. The collisions transformed some of the nuclei in the target atoms. Some of the atoms' mass was converted into energy. The Cockcroft-Walton experiment demonstrated for the first time a concept that Albert Einstein had proposed almost thirty years earlier. He had theorized that energy and mass are equivalent; they can be converted into one another. Let's hear Einstein tell about it...

EINSTEIN: It followed from the special theory of relativity that mass and energy are both but different manifestations of the same thing—a somewhat unfamiliar conception for the average mind. Furthermore, the equation *E* is equal to mc^2, in which energy is put equal to mass, multiplied with the square of the velocity of light, showed that very small amounts of mass may be converted into a very large amount of energy and vice versa. The mass and energy were in fact equivalent, according to the formula mentioned before. This was demonstrated by Cockcroft and Walton in 1932, experimentally.

The *New York Times* reacted to experiments like those by Cockcroft and Walton with enthusiasm...

NEWS ARTICLE: *"Science has obtained conclusive proof from recent experiments that the innermost citadel of matter, the nucleus of the atom, can be smashed, yielding tremendous amounts of energy and probably vast new stores of gold, radium and other valuable minerals."*

SZILARD

But the Cockcroft-Walton work—and every other nuclear physics experiment during the thirties—used up far more energy than it released. So physicists doubted that nuclear energy could be put to practical use anytime soon, if ever. Rutherford made this opinion public in 1933 at a scientific meeting, and his remarks were published in the scientific journal *Nature*:

NEWS ARTICLE: *"These transformations of the atom are of extraordinary interest to scientists but we cannot control atomic energy to an extent which would be of any value commercially, and I believe we are not likely ever to be able to do so... Our interest in the matter is purely scientific, and the experiments which are being carried out will help us to a better understanding of the structure of matter."*

RUTHERFORD

A few physicists were not so sure that nuclear energy could never be controlled. Leo Szilard thought of a possible way to do it. If he could find some sort of nucleus that would emit *two* neutrons whenever it was bombarded with one neutron, he might be able to set off a chain reaction. Szilard wanted to investigate various elements, including uranium. But he was not able to get money to do experiments.

It was only in 1938 that many scientists began to focus their attention on uranium, the heaviest of known elements. Leading the pack were two German chemists, Otto Hahn and Fritz Strassmann. For over thirty years, Hahn had been working with another talented scientist, Lise Meitner. However, Meitner was of Jewish ancestry, and had to flee Nazi Germany. Otto Hahn recalls...

HAHN: Miss Meitner—Professor Meitner—had left our laboratory on July 1938 on account of these Hitler regime things and she had to go to Sweden. And Strassmann and myself, we had to work alone again and in the autumn of '38 we found strange results.

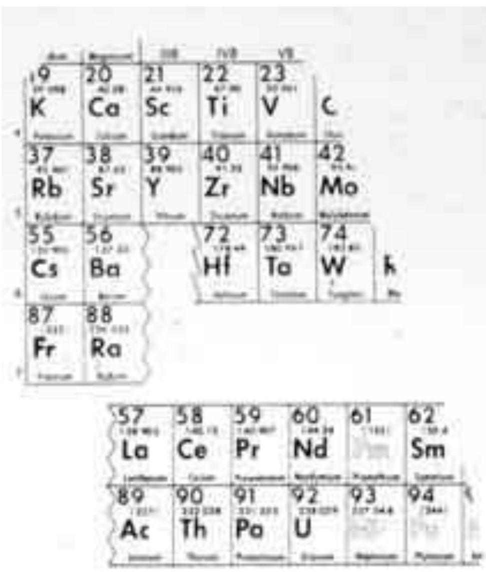
HAHN

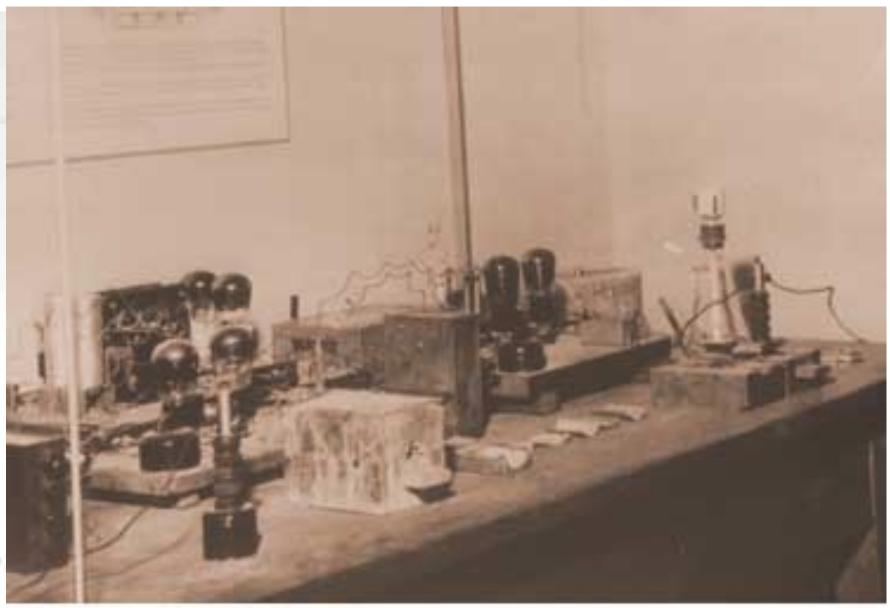
STRASSMANN

MEITNER

Enrico Fermi had begun this line of work, when he showed that neutrons work better than protons for penetrating and transforming a nucleus. By 1938, Hahn and Strassmann were among a number of scientists who were trying to find out what products are formed if you shoot neutrons into heavy elements. They hoped to find elements even heavier than uranium. Such altogether new elements would surely have scientific interest, and perhaps even practical uses. But the substances Hahn and Strassmann produced looked like radium or barium, two known and almost chemically identical elements...

HAHN: We made precipitations, Strassmann and myself, where we could be absolutely sure that there could be nothing else but either radium or barium.





HAHN'S WORK TABLE

But physicists did not suppose a heavy element like uranium could be transformed into a light element like barium. You might be able to knock off four protons from the nucleus of the uranium atom and create radium. But to get from uranium to barium, the neutron would have to chip off 100 particles! That seemed flatly impossible. Barium was out of the question...

HAHN: Therefore, we could conclude that the substances could be really only radium because barium was prohibited by the physicists that we didn't dare to think it barium in those times. We always tried to explain what is wrong in our experiments, not to say we do have barium, but we always thought it can't be there and therefore we have to say, "What is the nonsense we are doing?" So really, it is so, that we poor chemists—isn't it the same with you?—we are so afraid of these physics people.

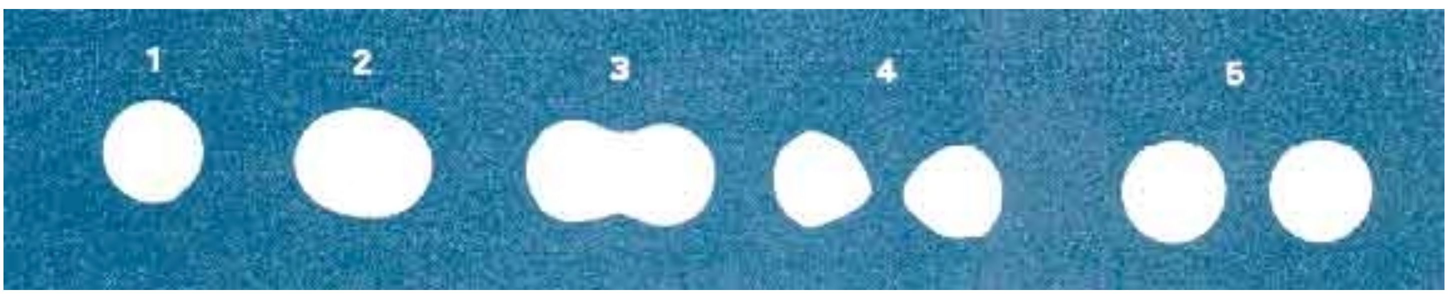
Hahn wrote to Meitner in December of 1938 describing the "strange results" he and Strassmann had found. Meitner was equally baffled—at first. Later that month, shortly before Christmas, her nephew Otto Frisch visited her in Sweden. Frisch was a physicist who worked at Niels Bohr's famous Institute for Theoretical Physics in Denmark. Years later, Frisch recalled his visit to Meitner in December of 1938...

FRISCH: **Lise Meitner was in Sweden and was lonely so I offered to come and visit her, and we met in the west of Sweden in a small place near Goteborg, and when I came she was brooding over a letter of Hahn. And then we sort of kept rolling this thing around and saying, "Barium, I don't believe it. There's some mistake. You couldn't chip a hundred particles off a nucleus in one blow. It's fantastic. It's quite impossible, a single neutron could do that." And I still don't know how we got to the concept of fission, but I remember Lise Meitner drawing a dotted circle on a piece of paper and saying, "Couldn't it be this sort of thing?" Now she always rather suffered from an inability to visualize things in three dimensions, whereas I had that ability quite well. And I had, in fact, apparently come around to the same idea, and I drew a shape like a circle squashed in at two opposite points. And Lise Meitner then said, "Well, yes, that is what I mean. " Apparently she had, so to say, looked at the nucleus from the poles on, and with the dotted line was indicating the equator being pushed inwards.**

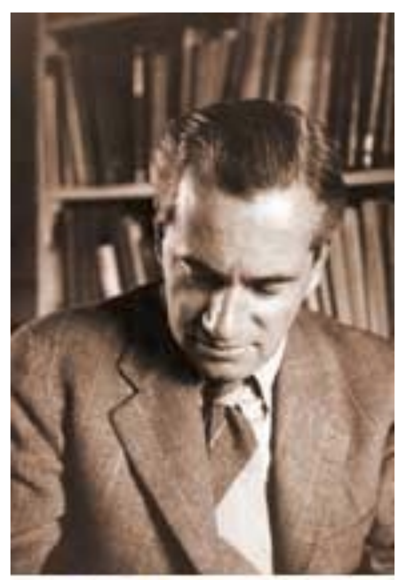
FRISCH

Meitner and her nephew continued their discussion outdoors...

FRISCH: **We walked up and down in the snow. I was wearing skis and she said probably she could get along just as fast on her feet, which she did, and gradually we came to the idea that perhaps one should not think of the nucleus being cleaved in half as with a chisel but rather that perhaps there was something in Bohr's idea that the nucleus was like a liquid drop.**



Now Meitner and Frisch understood what had happened in Hahn and Strassmann's experiment. The neutrons which they had shot into uranium had indeed been captured by the uranium nucleus. But then the nucleus changed shape, vibrated, and came apart entirely. This was not the usual slight transformation of a nucleus. The picture did fit neatly with a recent theory of Niels Bohr's. He believed that a nucleus behaves like a liquid drop, and a liquid drop hit hard enough, might stretch until it broke in two. Now, if that happened to a nucleus, a lot of energy would be released—atom for atom, far more energy than any process seen till then. Frisch continues the story of his visit...



FRISCH

BOHR

FRISCH: **I think I stayed there for about another day or so. We had Christmas dinner with some Swedish friends, and we discussed a few details. We agreed that we would have to write a paper about this, but we left it to be done separately somehow. It was eventually done in the way that I drafted a paper and read it off to Lise Meitner over the long-distance telephone between Copenhagen and Stockholm, and she would stop me and make comments and suggestions. So it was a slightly expensive way of writing a paper.**

My recollection is that when I came back to Copenhagen I found Bohr just on the point of parting, of leaving for America, and I just managed to catch him for five minutes and tell him what we had done. And I hadn't spoken for half a minute when he struck his head with his fist and said, "Oh, what idiots we have been that we haven't seen that before. Of course this is exactly as it must be." And he added, "This is very beautiful," and, had we written a paper? So I said no, we were in the process of writing one.

On his way to America by ocean liner, Bohr developed a more complete explanation of fission. He worked with a colleague, Leon Rosenfeld, who was making the trip with him. Rosenfeld later recalled their efforts...

ROSENFELD

ROSENFELD: **When we met on the boat, he said, "I have in my pocket a paper that Frisch has given me which contains a tremendous new discovery, but I don't yet understand it. We must look at it." Bohr accepted the conclusions because it was an argument directly following from the experiments. But he did not understand why the nucleus would split. And then during the trip that took six days, I suppose or so, he got hold of the solution, and it turned out to be extremely simple.**

Meanwhile, back in Denmark, Frisch wanted to check by experiment the idea that uranium can split in two. Several methods could be used to study sub-atomic particles. The easiest was to look at electrical effects in an ionization chamber, using an amplifier and oscilloscope. Invisible particles passing through the chamber would show up as pulses on the screen of the oscilloscope. The hallmark of fission would be the size of the pulses: the two halves of a split atom would have far greater energy than any known particle. Frisch describes his work...

FRISCH

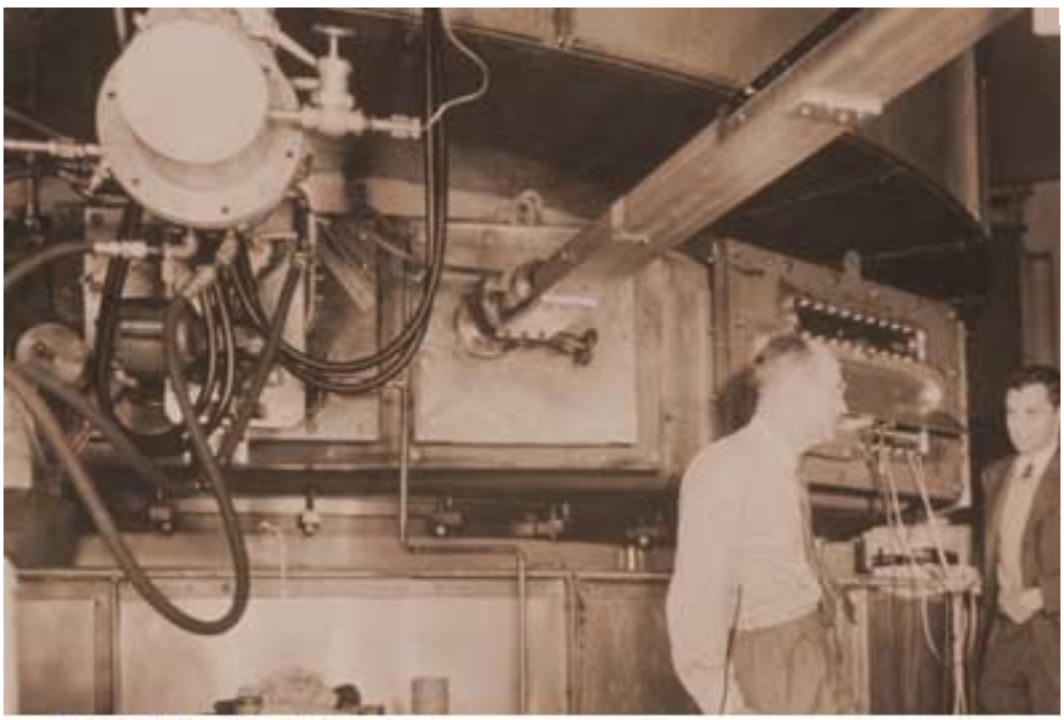
FRISCH: **I rigged up a pulse amplifier for the special purpose, and I also built a small ionization chamber; but the whole thing only took me about two days, and then I worked most of the night through to do the measurements because the counting rates were very low. But by three in the morning I had the evidence of the big pulses. And I went to bed at three in the morning, and then at seven in the morning I was knocked out of bed by the postman who brought a telegram to say that my father had been released from concentration camp.**

By this time Frisch and Meitner had finished writing their joint paper, in which they interpreted the Hahn-Strassmann results as nuclear fission. Frisch meanwhile wrote a second paper about his new experiments which confirmed their guess...

FRISCH: They were both sent to *Nature* at the same day but *Nature* published one after the other. And I might still mention that the word "fission" occurs in the first paper and was suggested to me by an American biologist, William A. Arnold, whom I asked what you call it when a cell divides itself.

On the same day that Frisch sent his two scientific papers on fission out for publication—January 16, 1939—Niels Bohr's ocean liner docked in New York. Enrico Fermi was on the pier to meet him. The Italian physicist had arrived in New York two weeks earlier. The Fascist government had allowed him to leave Italy to personally accept the Nobel Prize in Stockholm. Fermi, whose wife was of Jewish ancestry, had decided not to return, but to instead take a post at Columbia University. The next day Bohr came up to Columbia, and there he happened to run into Herbert Anderson, a physics graduate student. Anderson never forgot the meeting...

FERMI



FERMI AND ANDERSON

BOHR

ANDERSON: Bohr came to Columbia and he was looking for Fermi, and as he walked into one of the laboratories, expecting to see Fermi there, he didn't find Fermi, but he found me. And, although he didn't know who I was, he was so full of his news, that he grabbed me by the shoulder and he said, "Listen, young man, I want to tell you about something that's very important, that's recently happened in physics." Bohr doesn't speak very loud, he whispers, you see. He has to get very close to you, then he whispers in your ear, and he said, "Let me tell you about fission." And so, of course, I was overwhelmed by having such a great man pick me out of everybody and tell me, give me this news, almost for the first time. And so he began to explain about fission, and about how neutrons are captured in uranium, and how the thing got excited and then came apart. And released a lot of energy. Well then he had to leave and so he left.

FERMI

Anderson went to Fermi's office to tell him that Bohr was looking for him. But Fermi had already heard the news. Anderson continues the story...

ANDERSON: And Fermi said, "Oh, he says, I know. Let me explain to you about fission." So he went to the board and he began to show me. But of course, Fermi is much more vivid, and much clearer and I could always understand him much better. He was evidently very interested in this thing. I decided then and there that this is a very exciting subject and just right—maybe I could get a thesis out of it, which is all graduate students think about. I realized that Fermi had just arrived and that although he had achieved considerable fame as a theoretical physicist, I somehow had the idea that his first love was really experimental physics and it seemed to me at the time that what he really needed was a laboratory, some equipment and a good graduate student, and I had all three.

Anderson and Fermi made a sort of agreement...

ANDERSON: I would teach him about Americanisms and he would teach me physics and I would lend him the apparatus and we would work together. Well, you know, things weren't very hard to do in those days. So he says, "Why don't we get the electrode of your ionization chamber, put some uranium on it, let's go down to the cyclotron, and let's see if we can see all this energy release." And so we got busy just that afternoon. But there was a meeting, a theoretical physics meeting in Washington, the next day. And Fermi was supposed to go to that. And so he left and I began to wonder what to do and I remembered that Dunning was in and I came to Dunning, and I said, "Why don't we see if we can see this fission?"

John Dunning was a physics professor who Anderson had been working with already. Dunning remembers...

DUNNING

DUNNING: I went up to the 13th floor and brought down one of the old standard stand-by neutron sources, the radon plus berylium sources that had been used so much before. We put it next to the chamber containing the uranium and in considerable excitement we saw with even this very weak source about one big pulse, a huge pulse, on the oscilloscope every minute. The rate, however, was so slow that I had doubts whether this was really real or whether it was maybe a bad electrical contact. So we had another device, and installing that right next to the chamber, the rate went up according to my notes to something like seven or so with that device, huge pulses. We finally quit about 11 p.m. My notebook contains this phrase: "Believe we have observed new phenomenon of far reaching consequences."

Meanwhile Bohr and Fermi went to the theoretical physics conference in Washington, DC. One physicist in close touch with Bohr was John Wheeler.

WHEELER

WHEELER: Bohr felt that he owed it as a responsibility to Frisch and Meitner that word of their work-in-progress and their concepts should not really be released until they had had the proper scientific opportunity to publish it. And it was not until the second day of the conference that an issue of *Die Naturwissenschaften* was handed to him which had just come in, which had the work of Hahn and Strassmann; so then he could tell about it. And then of course everybody got started on the experiments.

Not only scientists, but also science reporters picked up the news. Across the continent in Berkeley, California, physics professor Luis Alvarez was particularly interested to hear of the discovery...

ALVAREZ

ALVAREZ: I remember exactly how I heard about it. I was sitting in the barber chair in Stevens Union having my hair cut, reading the *Chronicle*, and in the second section, buried away some place, was an announcement that some German chemists had found that the uranium atom split into pieces when it was bombarded with neutrons—that's all there was to it. So I remember telling the barber to stop cutting my hair and I got right out of the barber chair and ran as fast as I could up to the Radiation Laboratory. And my student, Phil Abelson, had been working very hard to try and find out what transuranium elements were produced when neutrons hit uranium. And he was so close to discovering fission that it was almost pitiful. I mean, he would have been there, guaranteed, in another few weeks—when I arrived panting from the Student Union with my news about fission, and I played it kind of dramatically. I saw Phil there and I said, "Phil, I've got something to tell you but I want you to lie down first." So, he lay on the table (right alongside the control room of the cyclotron). "Phil, what you are looking for are not transuranium elements, but they are elements in the middle of the periodic table." I showed him what was in the *Chronicle*, and, of course, he was terribly depressed.

Hahn and Strassmann's paper arrived in Paris at the laboratory of Frederic Joliot. With his wife, Irene Curie, Joliot had made important nuclear discoveries. Lew Kowarski was in the laboratory, and remembers Joliot's reaction to the paper...

KOWARSKI: It was on the 16th of January, and *Naturwissenschaften*, the famous number, arrived in the morning mail. Joliot probably had his first glimpse of the Hahn and Strassmann article in my presence, and it was, of course, a bombshell.

JOLIOT-CURIES

KOWARSKI

Don't forget that Kowarski is describing Joliot's reaction to the Hahn-Strassmann experiments; the Paris group had not yet heard how Frisch and Meitner had explained the strange results, in terms of uranium fission. But Joliot followed an almost identical path, as Kowarski explains...

KOWARSKI: Immediately, everything was understood. For the next few days, nobody talked of anything else. Joliot immediately had the ideas about splitting of the uranium atom in two. Then he designed his famous experiment, which is, I think, one of the most elegant experiments I know of in the history of science, and which he performed before my eyes. It was that simple, took a few days. So here it was. Fission was proved as physical reality. We still didn't know that Frisch had already observed it two weeks before.

Within weeks, the whole world knew about fission. Speculation about the vast stores of energy in the nucleus prompted a *New York Times* editorial in February 1939...

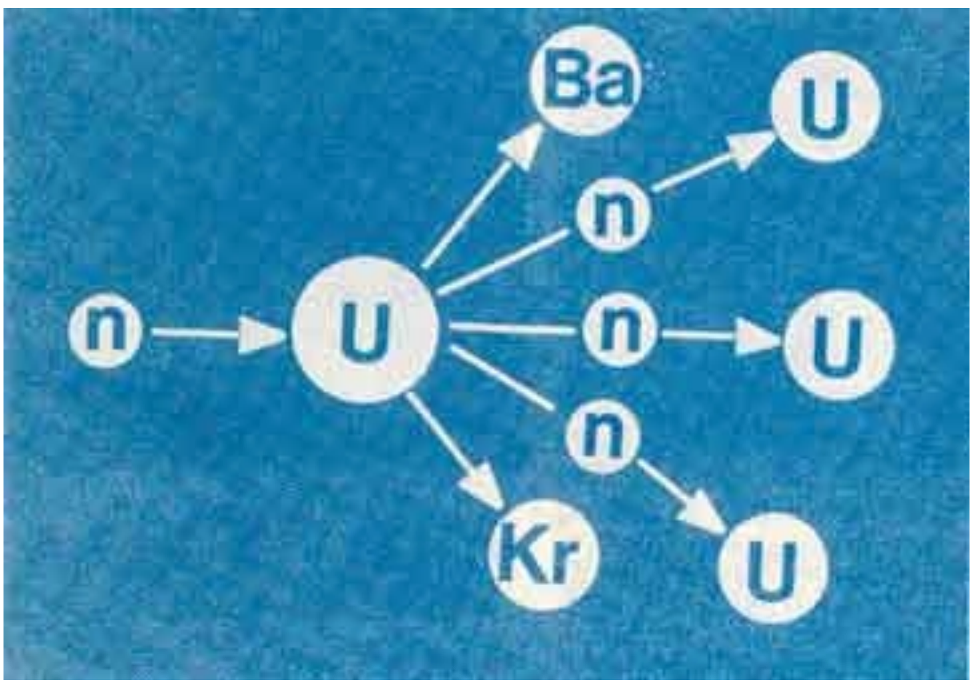
NEWS ARTICLE: *"The possibility of harnessing the energy of the atom crops up again. Rutherford...and other distinguished physicists did their best in late years to discourage speculations on the subject, because bombardment was so inefficient that more energy was expended on the atom than ever came out of it. Now the picture is changed... Romancers have a legitimate excuse for returning to Wellsian utopias where whole cities are illuminated by energy in a little matter." **

As soon as they realized that atoms can be split, physicists began to talk over the possible consequences. John Dunning recalls...

DUNNING

DUNNING: I well remember that on January 25, 1939 there was a session at the faculty club at Columbia around the lunch table. Bohr had been talking very enthusiastically about fission possibilities in Princeton and it seemed clear that this had to be really got at. Immediately, the question arises as an experimentalist, not a theorist, shouldn't there be secondary neutrons created? Or evaporated? If there were enough of these, then the long-sought-for key to a self-sustaining nuclear energy release might indeed be here. World War II was pretty clearly in the offing at that time and all of us recognized the far-reaching consequences that might be possible if fission could really be developed.

Being able to split uranium did not necessarily mean you could get a chain reaction and release a lot of energy. That question had to be answered before anything else. It was exactly the question that Leo Szilard had been asking for years. Now Szilard was in New York, another refugee from Fascism, and he was urging people to attack the problem. Herbert Anderson recalls...



ANDERSON: **Well, Fermi came back and the first thing he did when he came back to Columbia, was he got hold of me, took me in the office, and then began to write down on the blackboard all the experiments we ought to do. And, of course, the thing that was the most important, if you were going to make a chain reaction, is to make sure that neutrons come out. Of course, so far all that was known is that a lot of energy is released. But Szilard had already pointed out that to make a chain reaction you had to have more neutrons emitted than were absorbed. But, of course, Fermi realized that the two fragments of the fission would be very heavily neutron rich and it was quite likely that there would be some extra neutrons boiled off in the process. And so, he immediately designed an experiment which he wanted me to do with him to see where the neutrons were emitted. And so, we launched on a career of trying first of all to see whether neutrons were emitted and in what number. Experiments were also being done (in fact, they always seemed to be about a week or so ahead of us) by Joliot, Halban and Kowarski working in Paris.**

SZILARD

The Paris team, like Fermi, knew that a chain reaction would come only on one condition: if each uranium atom, when it split, spat out fresh neutrons. Joliot asked Kowarski to try to think of a way to detect them...

KOWARSKI AND JOLIOT

KOWARSKI: **I went home for lunch. And here is one of those classical cases when scientists describe how they got ideas. I perfectly remember which place on what street it was that I had the idea. The idea seemed so stupidly simple. If you observe any neutrons of higher energy, that proves it. It's rather elementary.**

The Paris and New York teams both found that neutrons do come out from split uranium atoms. Yes, a chain reaction was possible. Now the basic nuclear physics was in hand, and people could begin to ponder what to do with it. Over three years later, beneath the bleachers of the football stadium at the University of Chicago, Fermi led a team of physicists who released the first chain reaction. The physicist in charge at Chicago was Arthur Holly Compton. Here is his description of this historical moment...

COMPTON

COMPTON: **We entered the balcony at one end of the room. On the balcony a dozen scientists were watching the instruments and handling the controls. Across the room was a large cubical pile of graphite and uranium blocks in which we hoped the atomic chain reaction would develop. Inserted into openings in this pile of blocks were control and safety rods. After a few preliminary tests, Fermi gave the order to withdraw the control rod another foot. We knew that that was going to be the real test. The geiger counters registering the neutrons from the reactor began to click faster and faster till their sound became a rattle. The reaction grew until there might be danger from the radiation up on the platform where we were standing. "Throw in the safety rods," came Fermi's order. The rattle of the counters fell to a slow series of clicks. For the first time, atomic power had been released. It had been controlled and stopped. Somebody handed Fermi a bottle of Italian wine and a little cheer went up. One of the things that I shall not forget is the expressions on the faces of some of the men. There was Fermi's face—one saw in him no sign of elation. The experiment had worked just as he had expected and that was that. But I remember best of all the face of Crawford Greenewalt. His eyes were shining. He had seen a miracle, and a miracle it was indeed. The dawn of a new age. As we walked back across the campus, he talked of his vision: endless supplies of power to turn the wheels of industry, new research techniques that would enrich the life of man, vast new possibilities yet hidden.**

SZILARD

Leo Szilard recalled...

SZILARD: **There was a crowd there and when it dispersed, Fermi and I stayed there alone. Enrico Fermi and I remained. I shook hands with Fermi and I said that I thought this day would go down as a black day in the history of mankind. I was quite aware of the dangers. Not because I am so wise but because I have read a book written by H. G. Wells called *The World Set Free*. He wrote this before the First World War and described in it the development of atomic bombs, and the war fought by atomic bombs. So I was aware of these things. But I was also aware of the fact that something had to be done if the Germans get the bomb before we have it. They had knowledge. They had the people to do it and would have forced us to surrender if we didn't have bombs also. We had no choice, or we *thought* we had no choice.**

Enrico Fermi in 1952 summed up the feelings of all people today...

FERMI: It was our hope during the war years that with the end of the war, the emphasis would be shifted from weapons to the development of these peaceful aims. Unfortunately, it appears that the end of the war really has not brought peace. We all hope as time goes on that it may become possible to devote more and more activity to peaceful purposes and less and less to the production of weapons.

FERMI

We need your feedback so we can do more exhibits like this! Both our funding and our enthusiasm could falter if we don't hear from users. Please e-mail us at chp@aip.org or use the online form at https://webster.aip.org/forms/feedback.htm to tell us how useful this was to you (a brief word is great, comments and suggestions better still).
