A conversation
with
Nobel Prize-winner
Eugene P. Wigner

TWENTY-FIVE YEARS WITH THE BOMB

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ON DECEMBER 2, 1942, forty-two scientists met secretly in a tall, white, windowless room under the football stands of the University of Chicago to witness the first controlled, self-sustaining nuclear reaction. Three years later, the potential energy tapped by this experiment was exploded over Hiroshima. The spiritual fallout from that blast has hovered ever since.

Few men are as qualified to speak about the problems and promises of nuclear energy as Dr. Eugene P. Wigner, Professor of Mathematical Physics at Princeton. Winner of the Nobel Prize, the U.S. Atomic Energy Commission's Enrico Fermi Award and the Atoms for Peace Award, Dr. Wigner was a key member of the group that achieved the first chain reaction and has been involved in its consequences ever since.

Thinking back to December, 1942, was the chain reaction a scientific problem for you, or a military problem, or both? Both. Of course, in the short range, it was scientific, because it was a technical problem—not a difficult one, but not obvious either. It required a certain amount of thinking. But the surprising thing about the chain reaction was how easily it was established. Also, I think we felt—at least many of us felt—that the best chance to win the war was with a new weapon. We were afraid that the Germans would develop it, and if we did not develop it first, it would be the end of freedom as we knew it.

Were the Germans working on an atomic bomb? We knew that the Germans were aware of the possibility. The chain reaction—the basic process—was discovered in Germany, after all. And they had the ingredients: They had a great deal of uranium; they had heavy water, which we did not have; and they had very competent people.

Then what held the Germans back? I think Hitler believed that he would win the war before nuclear explosives could be developed. He guessed wrong about the outcome, of course; but we guessed wrong about the degree to which he took atomic weapons seriously. But I myself had a letter from Germany—smuggled out to Switzerland by a fellow scientist who was obviously not a very good Nazi—that said: "Hurry up. We are on the track."

How did you communicate your sense of urgency to President Roosevelt? Dr. [Leo] Szilard and I went to see Einstein about it. As I remember, Einstein listened to us for half an hour or an hour and then dictated a letter to Roosevelt at once, in German, and I translated it. Szilard and Alexander Sachs took the letter to President Roosevelt, who then started to take the question of nuclear weapons more seriously. It is interesting that the recollections about this are all so divergent. Some people think—I never argue about it—that it was [Edward] Teller and Szilard who went to see Einstein. I see Dr. Teller fairly often, but we never discuss it—it's not interesting. My recollection is so vivid that I can't believe that I am mistaken . . . but I may be. Well, the important thing is that the letter got written, and the thing got done.

Have you ever had any second thoughts, any regrets about your role in developing the bomb? I must say—in spite of what so many people say—that I feel it was the right thing to do. If a terrible weapon can be developed, it is important that the peace-loving countries should have a first claim on it. Because if the countries with more humane governments don't know how to defend themselves, then the danger is that these governments will be replaced by worse and worse governments. And to one who has seen governments less good than the United States Government, that is not an attractive possibility.

Then perhaps this feeling that you've just expressed, which I gather you share with many of your colleagues, stems from your having been born and raised in Europe. Very definitely so. You see, to an American, it is inconceivable that this country should ever be seriously menaced. It's just not possible. But someone who has seen countries destroyed may have an entirely different view. You smile about it. You think that's impossible, that America will be destroyed. But it is not impossible, it is not impossible; and that is what people do not fully realize: that we are living in constant danger of nuclear war.

Perhaps it is the suspicion of this constant danger that makes some people blame the scientists who developed nuclear weapons. Yes, but do they think that if we hadn't established the chain reaction, it would have gone undetected forever? If the United States hadn't done it—or if we American scientists hadn't done it—it would have been a provocation for other countries to do it.

But once the chain reaction was moved from the laboratory to the battlefield, and it became a question of the military use of the bomb, did the scientists involved feel guilty? No, no. Nobody felt guilty. Because to present a technical possibility is not to decide its use. The scientist does not, in my opinion, have a privileged position. If everybody decided what his work would be used for, then the automobile manufacturer would have the right to say that in his automobile, you mustn't drive from Poughkeepsie across the river. We did believe that it would be best for the United States not to explode the bomb over Japan or any inhabited place, and we signed a petition about it. But it was *not* because we wanted to claim our rights but because we felt that it was wiser not to do it. I don't know whether we were right or wrong; and that is not our competence. We spoke up on it because we knew that very few people had any understanding of the problem at all; and clearly those people who know about the problem are the only ones who can voice opinions. But to my knowledge, none of us felt that we had the *right* to decide what should happen.

Was Dr. [J. Robert] Oppenheimer an exception? Certainly he was one scientist intimately associated with the development of the bomb who later had second thoughts. As you know, Dr. Oppenheimer was one of the very few scientists who was in favor of the military use of the bomb. Now, why he was in favor, I don't know, but he may have been absolutely right. But there is a story that later he went to President Truman and said, "My hands are bloody." And Truman was supposed to have said, "No, I don't see that," with the intention of not understanding the allusion. I don't really know too much about Dr. Oppenheimer's attitude; but, generally, the higher up people were, the more they were in favor of using the bomb in the way it was used.

It does seem that involvement with the development of nuclear weapons entailed a certain loss of innocence for the scientist. Yes. You know, the annual national expenditure for research and development is $23 billion. I think the scientist faces the great danger of affluence. The scientist, like other men, has been freed of the worry of tomorrow. This naturally arouses in him the desire for influence. This is something foreign to the scientist, but apparently not entirely foreign.

Perhaps people expect science to find answers to problems that science created. This is really asking too much of science, isn't it? Because these problems were created by human desires, and human desires are not dictated by science. A friend of mine once said, "The intellect is our servant; our desires are our master."

I gather that you would prefer a certain amount of obscurity. Yes. Yes, I was happier when it was different, when I could say anything I wanted and nobody cared. It was much nicer to be somewhat looked down upon as a queer guy who works for science and who does something impractical and who isn't to be taken very seriously. Science is to some degree an escape. It was particularly an escape for me. It is something that you can immerse yourself in, find beauty and pleasure in, without harming anybody, without having much effect. To be taken very seriously deprives one of a degree of freedom to think freely, to say clearly what one believes—because it may be unpolitical. And I don't think this is good for the scientist.

One of the most pressing public demands is for an end to the arms race, a relief from the balance of terror. Do you see any viable alternative? Arms reduction, perhaps? I propose just that, as a matter

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of fact, and at the same time, I am advocating that the U.S. develop a strong civil defense. It would be much better if we all disarmed, of course. But to disarm is difficult, because how do you know if Russia is disarming, how do you make sure that China doesn't develop terrible weapons? It's very difficult. But, short of that, we could all walk around in armor. It is a beautiful attitude to feel that nobody wants to hurt me, I walk under God's sun, I'm happy, enjoying my life and the beauty of nature. It's less beautiful to be in armor; but it is better to be in armor than to be so frightened. The Russians are working very hard on civil defense, and I can't understand why I have so much trouble promoting my views.

Do you think that Americans prefer to think of defense as purely a military problem, leaving everyone else carefree? Definitely. We all eat big steaks: few of us would be willing to kill an ox. Similarly, we all want our freedoms defended, but. . . .

Do you think that civil defense can be truly effective? Yes. Of course, "effective" is a very general term. You can't defend a country against nuclear weapons to such an extent that there would not be very, very severe fatalities if another nation attacked us. So it is easy to say that there is no defense, just as it was easy for many people to say you can't establish a chain reaction. If you don't want to do it, you can't. But effective and serious civil defense—particularly in conjunction with antiballistic missiles, but even alone—would decrease the number of deaths as a result of nuclear attack enormously. And the really important thing is that the more we face up to these realities, the less likely it is that we will actually be attacked. You see, the French and British did not want to face the possibility that there would be a war. "Peace in our time." Appeasement. And look what happened. If you say "this far and no further," the other one understands it much better. He's not so tempted. And one way of saying "this far" is to say "we're ready." In that case, the enemy would not threaten, because they know that if they threaten, people will be protected, and the country can defend itself. Blackmail works only if the people are unprotected.

The Government has just announced a $5 billion antiballistic-missile system with no provision for civil defense. Does this worry you? I think it is very dangerous. Not to involve the people at all in their own defense is very dangerous. I don't think a democracy can live if every decision is left to the government. I think if the people themselves cannot participate because it's too technical, it's very dangerous. The subject of antiballistic missiles is too complicated, but the fact that we are determined to defend ourselves can be brought home to people by deciding to build protective structures. This would make people realize that there are some things we have to do. Maybe in a better world, with better people, it would not be necessary to build shelters, but we don't live in a better world.

Do you think it's partly a question of national priorities? But I don't really understand this, I'll be very frank about it. We spend on the Vietnamese war $27 billion a year; the shelters we were considering would cost a total of $20 billion, period. Do you know what the annual civil-defense budget is? $100 million. Every American contributes fifty cents a year—fifty cents a year!

You seem to be suggesting that we could create in place of the "balance of terror" what might be called a "balance of safety." Of relative safety, yes. And I would prefer that. It would be a nicer race to be in, wouldn't it?

Are the Russians ahead in this civil-defense race? They are very vigorous about it. There's no question but that they are much better prepared. They have extensive evacuation drills, and also extensive instruction in how to make so-called hasty shelters. They are also much less urbanized than we are, and that in itself is a kind of civil defense. Evacuation is a possibility for them; I shouldn't think it would be so much for us. In the larger population centers, it would be terribly difficult.

On a practical level, what kind of shelters would we have to build? Could they be multipurpose structures? Very frankly, I was always against multipurpose shelters because I said people should walk on this earth with open eyes. But I was convinced that I was wrong. To some degree, we all need to be fooled. On the one hand, I feel that people should not be guided as sheep, that they should be aware that this is the world we live in, this is the world we *want* to live in, and we want to behave in the way it is necessary to behave in this world. On the other hand, I also feel, well, a little help, a little palliative, may make it easier for people.

Do you favor individual shelters in the absence of public shelters? I don't think individual shelters would be really effective. Most people would have difficulty knowing when they can come out. Also, they would get disoriented, so that society would fall to pieces. So I am very strongly in favor of community shelters. In the community shelter, you would be in touch with the news, you would be able to see your doctor if you were sick. Of course, you would be terribly uncomfortable if you couldn't see the sunshine—there would be hundreds of discomforts. But still, it isn't the same thing as being isolated with your family from almost every human contact, not knowing when you can come out, not knowing what is happening in the world.

Speaking again of national priorities, do you feel that enough effort has been made since World War II to develop peaceful applications of nuclear energy? It's very difficult to judge our progress. For instance, for a long time, we were not clever enough to make atomic power economical. Now, about a year ago, atomic-fueled electric power suddenly became competitive with fossil-fuel energy, and I think that more than half of the new power plants now being planned are nuclear powered. The power potential from all the reactors that will be in operation by 1970 is more than half of our total power potential 25 years ago.

Wouldn't this have greater implications for other countries, particularly small countries without fossil-fuel resources? That's very important, that point. I'm sure you have heard about the proposal which Lewis Strauss sponsored so energetically to build tremendous atomic-powered water-distillation plants in the Middle East to relieve the shortage of water there and make the desert bloom. But nuclear energy is also important here in the United States because it offers a way to produce electric power without contaminating the air. Also, if we do not go over to nuclear power, we should run out of economical fossil fuel in about—I hate to say it—40 or 50 years.

Do you feel absolutely sure that nuclear power stations are safe? There is often some concern in communities where such facilities are being located. Well, nothing is absolutely safe, but I don't believe a very serious calamity can occur. A great deal of energy and attention is being devoted to safety. Naturally, we must not relax our vigilance.

Aside from electric-power production, what are the most promising peaceful applications of atomic energy? Medicine—my biologist friends tell me about miracles—food preservation, perhaps food production: what are the principal needs of mankind? Because, after all, it's a question of energy, and atomic energy could be very useful. But other major needs of mankind are spiritual needs, and it's not clear in my mind how these could be helped by nuclear energy. So far, nuclear energy has aroused people's desire to increase their power, and in that way, nuclear energy has been dangerous. That was our error, that we did not realize this.

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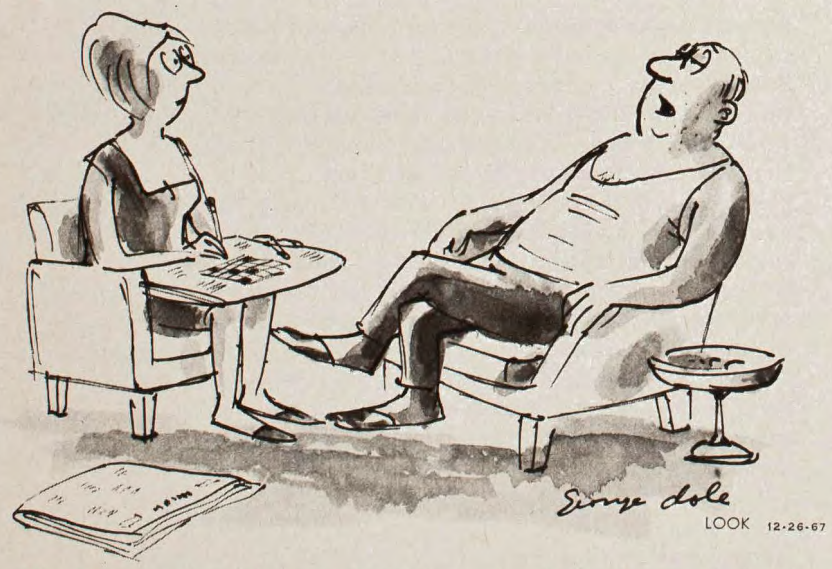

"No, I don't know what 'apathetic' means, and I couldn't care less."