Maariv, By Ben Caspit, May 17, 2019

The Educational System? It's effective?? - Life outside Earth? – He doesn't rule it out - The outgoing president of the Weizmann Institute breaks stigmas

For 12 years, Professor Daniel Zajfman has been the head of this important scientific institution. Now, as he wraps up his position, he speaks about 'the brain drain' (Israeli academics and professionals who leave Israel), the Screen Generation and he attacks the ethical code for political activity.

At age 20, he immigrated to Israel from Belgium on his own. Some 15 years later, he was already a professor with vast experience at the Technion and Weizmann Institute, the two pantheons of Israeli science. At the end of this year, he will complete his successful tenure as president of the Weizmann Institute. For 12 years, Professor Daniel Zajfman has headed the institute perceived as the symbol of Israeli excellence over the ages. He was the youngest president in the history of the Institute, and one of its more fascinating ones. During his years of tenure, the Institute's budget was doubled and it established its position as part of the global scientific echelon. Despite all of this, Zajfman remained a modest, straightforward, focused and optimistic man. Yes, optimistic.

The Israeli educational system is denigrated and eulogized by almost everyone.
Do you share this view?

"In the present age, school is no longer intended to impart knowledge. It is meant to instill a desire to learn. One can access knowledge from the internet. The question is how to generate a desire to learn. What determines this is the environment in which you live. The atmosphere in the classroom, the teachers, the school. This is critical. The perception whereby children would learn if only we had good teachers and orderly classes is a Singaporean concept. The Israeli conception is different."

Singapore is a global model of success. Are you dismissing this theory?

"When I travel to Singapore, they try to learn from me about our secret to success. They look at us with admiration. It's true, on the PISA (Programme for International Student Assessment) tests and

other indices, Singapore is at the top and Israel is in the middle. However, we have an amazing hi-tech industry and Singapore doesn't. If you take a system that requires you to answer questions that have been asked for a hundred years and to solve equations that have already been solved, that's Singapore. On the other hand, our system is somewhat chaotic. But this system and the social environment allow you freedom of thought and they stimulate curiosity. It might be a bit over the top in Israel, but the outcome is good. In Singapore, they asked me, with envy, what is the difference between their system and ours? I told them that it's about giving too much respect to authority. That's the story."

If you take a system that requires answering questions that have been asked for more than one hundred years, you get Singapore. Our system on the other hand is somewhat chaotic. But this system and the social environment enable you freedom of thought and stimulate curiosity. And the outcome is good.

So you are essentially saying that our educational system is more successful than in Singapore?

"Our children don't show a lot of respect to teachers. The opposite is true in Singapore. I gave lectures there. They sit in an extraordinarily orderly and quiet fashion. At the end of the lecture, they ask no questions. Here, even before you open your mouth, they already are asking questions, they essentially know more than you do. With regard to imparting knowledge, this is problematic. But I wouldn't change it. You need to give people the feeling that they are capable. That they can ask questions. That they can think for themselves. Knowledge can be acquired anywhere; the teacher is necessary to provide the stimulation. This is exactly the Israeli educational system's secret to success and I think it is a successful system. We have succeeded in instilling in our children a desire to become someone. To make an impact. They are bold, they ask questions, they do not bow their heads to authority or people in the know."

You are dispelling a stigma here. Is the Israeli educational system a success story?

There's a lot to improve; and at the Weizmann Institute, we deal with this on many levels and in different geographic regions. But the picture of our children that we receive through all types of achievement tests (Meitzav national testing and PISA) does not represent the real situation. Look at what is happening here. Do we lack musicians, authors, filmmakers, scientists or engineers? Do we lack excellence? Things are working well. One needs to ask what the goal of a good educational system is. Is it a matriculation diploma with a lot of credits and good grades at age 18, or becoming a

citizen who contributes to society at age 40-45? In my opinion, the latter is true. Singaporeans and the Chinese strive for the former. So, it's true, we don't like what is happening at school and we are critical about how it educates, but in order to learn physics today, one doesn't need a school."

Then you're saying that educational system is a detriment?

"No. A framework is necessary. Studies are necessary, tests are necessary, and they must be passed on the day and at the hour that they are scheduled. There must be a commitment to come prepared. Like in sports and the Olympics. However, too much emphasis is placed on the test. Think about the great athletes. What makes them come to the pool for five to six hours every day, in any condition and in any type of weather? Or to lead an ascetic lifestyle that demands complete dedication? It's an inner motivation. It's their desire to prove to themselves that they can succeed. Not because someone told them to or asked them to. That's the role of the educational system. To make the students prove to themselves that they are capable. I am occupied with creating people who want to learn. Stimulating curiosity. That's the whole story."

I don't know what will happen with the children and screens, but I can tell you that the young scientists and children who come here, who already belong to the beginning of the Screen Generation, are just as good as those who preceded them. On the contrary, they might be better.

SECOND GENERATION – HARD CORE

Zajfman's parents, refugees from Poland who fled to Belgium in the 1920s, met and married after the war. Most of their family members perished in the Holocaust. "Yes I'm second generation – hard core." He admits that he lives and breathes those days of terror. He has one sister, Deputy Commander Miriam Azori, head of the crime lab at the Israel Police. "She is the real scientist of the two of us," he says with a smile, "But she doesn't like when people talk about her." Miriam moved to Israel before him, on her own. Later, at age 20, he joined her. He studied Hebrew, served in the IDF for two years, earned a bachelor of science degree in physics and then continued directly to a doctorate. He is happily married and father of two (one at the Technion, and the other at the Weizmann Institute, naturally).

What did you do in the military?

"I taught physics to pilots in the Israel Air Force."

Where does your interest in physics come from?

"From childhood. When I dream, it's about physics. My father was an electrical engineer. Since I was 6 years old, I spent time and played in his workshop. I knew how to connect resistors and transistors before I knew how to read. He told me I could do what I wanted, as long as the workshop didn't go up in flames. It was an amazing playground. I was electrocuted at least three times. I could connect things, generate lights, build. And then, I received a transistor radio as a present."

You are describing a defining moment.
"True. The first time I encountered a radio, I was amazed. I needed to know how it worked. How someone could talk in a studio somewhere and I could hear it in my house. I tried to understand, I went to the library, read books, I didn't understand anything. I was 13 years old. It was incredibly frustrating. I realized I must study physics in order to understand the transistor. I remember the day at the Technion that I read the explanation of how electromagnetic waves are transmitted. It's called the Maxwell Equation. Second year at the Technion, third semester. Suddenly, I understood,

what joy that gave me. It took me ten years, but finally, I could explain it. Physics gives you the feeling that you understand the world. The phenomena. Nature. You look at everything differently. You look at the blue of the sky and can explain it."

So, a physicist can also explain Creation? Is there a contradiction between being a physicist and religious belief for example?

"There is no clash between faith and science. People try to create this friction, but it doesn't exist. They seek a battle between faith and science but it doesn't exist. Religion is faith and people are free to believe in whatever they wish. I do not believe, but I highly respect those who do and can understand why they have a need to believe. I never saw God in my equations. He didn't appear. But I don't think we can say that we have all the answers. That is arrogance. We try to create the best model to explain the phenomena around us."

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Give me an example.

"Take a jet that is running on a runway and suddenly, at a speed of 275 km/hr., it takes off into the sky. It's amazing. It's a theory that proves itself each time. Is this absolute truth? I don't know. But it is an exact model that improves our lives. And there are many theories, electricity, gravitation, thermodynamics, it all works. The jet reaches the end of the runway and takes off. It's a fact."

So physics is essentially models and theories that explain the environment?

"As scientists, we try to get as close as we can to exact models. Our curiosity leads us to try to understand the environment. How it was created. To recreate what happened. There are big questions that have not been solved. The Big Bang Theory explains a large part of the things, but not all of them. You can more or less understand how the universe was created, how complex life was created, how molecules connected in order to create life. Life itself is biology. The connection of the molecules is physics."

In other words, you were there before the biology.

"Exactly. We're the basis."

In your opinion, what percentage of what we need to know about the universe do we already know?

"You never know what you still don't know. I estimate that we currently understand about 4% of the universe. There is still 95% of what we call grey material, grey energy, words we invented in order to explain that we have no idea. Look at what we have done with the 4% of knowledge, imagine what could happen if we knew more."

In your opinion, is there extraterrestrial life?

"I venture to say yes. I don't know, I'm just guessing. We still have a lot of holes in solving the issue of Creation. Look, the material that you and I are made of is no different than the material that makes up the chair on which you are sitting. It's the same atoms, just in our case, it is organized

differently than in the chair. We don't entirely understand the chain of events that created life. Consequently, to assume that we are the only life form in the universe is entirely presumptuous."

"What has changed the picture in the past 25 years in this field is astrophysics. Until that time, we only knew about one sun and nine planets or eight plus Pluto. We didn't know that there were other planets. An infinite amount. The telescopes have become more sophisticated. It multiplies the chance of additional life by multiple times."

THE LAND OF UNLIMITED POSSIBILITIES

Let's go back to our planet. Where did you learn about Zionism in Belgium?

"From the *Hashomer Hatzair* Youth Movement. I was a member of the movement in Brussels; and later, I was the leader of the branch. I visited Israel three times, visited kibbutzim and was enchanted. In general, everything I am today I owe to my days in *Hashomer Hatzair*. Those were years in which I gained tremendous experience, culture, values, consideration of others, leadership. The significance of being a counselor, being a leader, leading people, listening, and of course, Zionism. I remember my first visit to Israel. Suddenly, I understood that there is something here that exists nowhere else. The fact that your chronological age is insignificant and is not the determining factor."

What do you mean?

"In other societies, age is a rigid factor that is connected to your advancement in life. In Israel, this is not the case. At 18, young people are assigned weapons, together with an enormous responsibility. It may sound stupid, but it's amazing. I always believed that young people are the beating heart of society, and I suddenly discovered a country that takes its young people and assigns them important positions. I understood that Israel, and not the U.S., is the land of unlimited possibilities. There are countless options here."

"I said to myself, listen, you can do everything here. And this relates to what I said earlier about the children: they are brash, they are bold. I related to this entirely and I have been dealing with this all my life, even as president of the Weizmann Institute. Both Zionism and the social sphere are very important to me. Let's jump ahead 40 years, and suddenly, at an age younger than 20 years old, my daughter is a commander of an air force control tower, she is in charge of take offs and landings of F-16 fighter jets, and it's amazing."

We spoke about Israeli chaos. It also has its disadvantages, doesn't it?

"I headed an important research institution in Germany. When I completed my assignment in 2006, I was invited to meet the German president. There were dozens of guests, the Israeli ambassador, dignitaries and scientists. I sat next to the president and he asked me a tough question: As a scientist who has worked both in Israel and in Germany, where is the science better? How does one answer such a question? So, I asked the ambassador who was sitting next to us, what he thought about Israeli drivers. Crazy, right? So that's the story I told them. In Israel, we do science like we drive. In Germany, you do science like you drive. For us, a stop sign is just a suggestion. Also a red light. It's dangerous on the road. In the laboratory, it's fantastic. That's exactly what you want as a scientist. No boundaries. Everything's possible. You are capable. You know the best. Most of the time it fails. But in the split second that it succeeds, nothing else is like it."

"This amazing moment, in the lab, when you know that you have done something that no one else has done before, is worth everything. So, we probably won't build a Mercedes, but we will invent WAZE and Mobileye and Copaxone and a flash drive and sell them. It's a matter of character, and our educational system leads us there. I think that we need to preserve this and not try to imitate the others. Our story is creativity. I don't know how to measure creativity but I know how to identify it."

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INVESTIGATION DRIVEN BY CURIOSITY

Professor Zajfman is considered a big fan of the perception of science as a detached bubble, with no commitment to industry, in order to solve given problems or for economic management. In contrast, currently, most scientists tend to work in the fields of 'applied sciences', i.e., they are hitched to some economic model that strives to ultimately lead to a profitable product. Professor Zajfman's approach seemingly contradicts the fact that he runs a vast scientific institution and is expected to raise funds, find investors and generate revenues that will enable him to continue to develop. I asked him to explain this paradox.

"I don't see the paradox. There is no organized formula here. I never said or thought that we don't need applied science. Of course we do. Most of the world's research is currently applied research. Five years ago, the electric car traveled 80 kilometers without needing to be charged, and today it travels 100 kilometers. In two days it will travel 150 kilometers. Scientists are working on it, and their mission is to increase the travel range. It's important. But part of the science must remain within a bubble, detached from a specific use or need, completely independent. It's essential."

Explain.

"First of all, it's because the important large inventions in history were not invented by people who tried to solve problems. It's a fact. You go to the dentist who gives you an X-ray. Go back 150 years. No one could imagine such a thing. That there are rays that can penetrate your body and zoom in only on the bones and create a picture. There was no plan to discover this, simply because they didn't know it existed. Then comes a German named Dr. Wilhelm Roentgen, who just wanted to understand how electrons pass from one place to another. It was incredibly boring, but it interested hm. He had an open mind, his eyes were open, and he looked at the wall and saw something strange. He was lucky, but also had talent. This experiment was conducted previously by many people, but no one looked to the side for a moment. In order to discover something that previously didn't exist, this is exactly what is necessary. Curiosity, an open mind. Take WAZE for example. The GPS only works because Einstein developed the Theory of Relativity. Without the Theory of Relativity, there would be no WAZE. At first glance, there is no connection. But the connection exists and is essential."

"The present amount of technology that is based on those basic inventions is enormous. The advancement of science and of society is not reached by people who tried to solve an existing problem, rather by those people who tried to understand how nature works. This is what has propelled humanity forward throughout the generations. In my opinion, too much money is currently invested in applied research. We need applied research, but not at the expense of basic

research that is free of obligation, and is motivated by a simple factor: the human curiosity of outstanding people."

Isn't it a bit unrealistic to investigate for the purpose of curiosity? Can an institution like the Weizmann Institute be run based on this?

"Definitely. There is no other choice. And we must not limit curiosity in terms of time or space. Only in this way can discoveries be made that you were not intended to reveal. Let's go back to England, 200 years ago. Light was generated by candles. There was a huge industry was developed to manufacture candles. A tremendous amount of money was invested and there was vast research, in terms of the color and smell of the candles and the duration they could be lit. Then someone came and invented electricity. Someone else. It doesn't matter how much you would have invested in candles; you never would have discovered electricity through candles. It happens only if you have the best people with curiosity and the ability to simply research. They must be provided the infrastructure, time and complete freedom, and eventually, they'll discover something that no one expected to discover. And Weizmann Institute excels in this field. It's our job. To take knowledge, together with curiosity and passion, and go all the way with it."

What is the role of passion?

"Passion, enthusiasm, tenacity. The hard problems. You try to understand nature. There is no one to talk to. You ask yourself. There is no partner. You are alone and trying to understand. Without passion, enthusiasm and tenacity, you will give up along the way. You won't reach the goal. It must be a part of your soul, no less. And you need luck. And skepticism. In science, many times you break with conventions. When Einstein arrived, he broke with Newton, whose work was previously set in stone until that time."

LIVING IN ISRAEL IS A PROFESSION

Let's talk about the famous brain drain (flight of academics and professionals). About the hundreds and thousands of Israeli scientists who are dispersed around the world. Does this concern you? Is it a strategic danger to Israeli science?

"Of course, there is a brain drain and we lose good people. I personally see each person who leaves as my failure. Is it a strategic matter? I think not. We are exporting scientists. This is a branch of Israeli export. Visit universities in the U.S., you will see them in droves. Obviously, it would be better if they had stayed here and researched here, but that's not the main problem in my opinion. I think the main problem is not the export of the Israeli scientists, rather it's the fact that there is no influx of foreign talent into Israel."

Explain.

"Look, here in Israel, we are all similar. The Israeli academia is comprised of people who are 99% similar to one another. It's a cultural, ethical, cognitive similarity. We grew up together, were educated together, experienced the same experiences, think in the same way. Now, enter a good university in the U.S. or Europe. Look at the scientists and researchers. Some of them aren't American. At times, most of them are not American. You know what the initials MIT stand for? Made In Taiwan. A miracle happened to us here and we have succeeded in establishing a world-class university system, based completely on our educational system, the one that everyone claims is not good. The results aren't bad. Until now it has been successful, because Israel was a nation of immigrants like the United States. Most of the people here are first or second generation, coming from different cultures. This is the beauty and the biggest advantage of the gathering of the exiles. It's important for culture, music, art, and particularly, science."

I still don't understand.

"In science, the way you approach the scientific problem is directly related to the background from which you come. Your culture, the way you think, your associations, your education. The Indians ask different questions and reach their answers in a different way, for example. Science requires this diversity. The last time we obtained such diversity was during the fantastic immigration from Russia 30 years ago. From an academic standpoint, this wave of immigration worked miracles here. It added another cultural aspect. The problem is that since then, there has been stagnation."

How many foreign scientists do you have at Weizmann Institute?

"Those who came here to become researchers in Israel? Three or four. Out of 250 scientists."

How many are there in a corresponding institute or university in the U.S.?

"Between 30 – 50%. I don't dream of such numbers, just give me 10 or 20% and I'll be set."

They'll say you are crazy. First bring back our men and women from laboratories overseas, then think of the Indians, Chinese and Koreans.

"So let them say it. It's irrelevant. The foreign scientist enriches us. It's true that to date, the situation looks good; but I claim that in another 20-30 years, if we continue to concentrate only on scientists who grew up and were educated here, we will become a peripheral society and that's dangerous. When you close yourself in, when you are alone, at first it's good because you enhance the local talent; but as time passes, it atrophies you. The genetics work not only in a cultural sense. Culture is also created from exposure to other cultures; and science is first and foremost culture. There is a danger here."

"To date, the many waves of immigration have saved us. The Institute's scientists travel a lot to other universities, and there is a crucial exchange of international relations. It's difficult to explain just how critical the option of working with different people is, people who think differently, who were educated differently, who speak a different language. It's critical. I have been part of many such collaborations, I have met countless foreign students, who are no less superior than us, but are simply different."

So why do you only have three-four foreign researchers? Why don't they come?

"Because living in Israel is a profession in and of itself. You search for the best, but they have offers from Stanford and MIT and many others such as those, and they must decide whether to live in Boston, Los Angeles, Paris or Rehovot. Any way you look at it, Israel is located in the Middle East. Spain is located to the south of France. To our south is Gaza. They must come here, settle, start a family. Research is not a 1-2 year business. In terms of procedure, I can give them everything. I have no complaints against the Ministry of the Interior or the government. My problem is the regional image."

HIGH RISK, HIGH GAIN

I read an interview with you in 2011. You announced that you are investing $80 million in research on subjects related to personalized medicine. Today, you are reaping the benefits.

"The field in which there has been the most dramatic changes in the past 20 years is biology. As opposed to the past, today, there is not only an ability to explain the existing situation but also to delve into the complexity, the reasons, the understanding that there is no one body that is similar to the other and no one aspect that is standard for us all. We are not similar to one another, not only externally but also internally. Once, humanity gave names to diseases. You came with a set of symptoms and the doctor told you that you had the flu. And now, we have discovered that no one flu is the same as the other, that no one cancer is the same as the other, even if both are in the liver.

"The drugs were once customized to the diseases. Today, they are customized to the people. It's an enormous revolution. What was once defined as phenomenon X, is today divided into an infinite number of phenomena. The field in which everyone feels this with great intensity is cancer. Once, cancer was disease X. Later, it was divided according to organs that it attacks. Lungs, liver, breast, pancreas. Now the division is different. It's as if it is not the same disease. There is tremendous specification. And one drug will not work. The treatment is personally customized to the patient, to the specific cancer that only he has. Science currently offers the doctor the tools to reach an exact analysis and personal diagnosis."

"At the Institute, we have someone who is working on this, and the progress is rapid. It makes things very complicated and also very expensive, because if you treat each patient separately, then this is another story entirely. It still is unclear how it works and how it will look in the end, how the mechanisms will suit one another, but it's clear that we have a historic change here."

Bottom line – are we getting close to a victory over cancer?

"Define victory. It's hard to know, but it's clear that we can live a longer life with cancer. The disadvantage of cancer is that in the beginning it doesn't hurt, so you don't discover it on time. If you catch it early enough, then you can live with it, manage it, like with diabetes. There are also cases of full recovery, such as in the field of immunotherapy, of people returning to live a full life

after they have touched death. Can I say we will reach a full recovery with every type of cancer? I don't know."

So, today after you have told us all of this, when a scientist comes to you at the Institute and asks for a research budget, isn't there a question at the back of your mind as to what could come of this research or whether this is the next Copaxone – Don't you have to generate revenues and manage a huge institution?

"Absolutely not. I don't want to be a businessman. I must not be. If I try to be a businessman I will be like everyone else. But if I try to find the most outstanding people, and provide them the infrastructure, the quiet setting and the freedom, that's my advantage. Only in this way can we discover things that no one else has discovered. One of the drugs we are currently working on at the Institute is a specific procedure for prostate cancer. The person who invented it is a botanical scientist. What's the connection between plants and prostate? There is no connection. Would a drug company have hired him to find a drug for this cancer? Never. We also haven't hired him for this. We recruited him because he is excellent. And after 25 years, he left the laboratory with a drug and reached the conclusion that photosynthesis can be used in order to cure prostate cancer."

So you simply let your scientists do what they want?

"There is follow-up. We have control committees and systems that monitor and supervise, but I don't come by every two weeks and demand a report."

Aren't you worried that deadbeats will hide out here and just enjoy life pretending to be scientific?

There's always that risk, but it's not serious. When you recruit talented, curious, passionate people, they won't become deadbeats. If you have identified the right people, you can work with them with confidence. We work under enormous risk. It's known as High-Risk-High-Gain. Whoever takes large risks can also reap a large profit. You need to be tenacious and diligent. It may take years. Not five years, sometimes 25 years. Take Copaxone, the Institute's most famous symbol that began here in 1966. When did the drug reach the market? In 1996. 30 years after the process began. Yesterday, we celebrated the 95th birthday of the inventor, Professor Michael Sela, who worked on it with Ruth Arnon. In 1996, did they know that they were working on the drug for multiple sclerosis? No. They just wanted to understand the peculiar substance that wraps the neurons. Teva has made billions from it and it became the nation's stock, etc. So curiosity is an enormous asset. You don't have to look far. Don't presume the future – invent it."

So, how do you manage with the tension between being the institution's director with huge budgets and resources that must be raised, and a curious scientist who takes risks and provides people infrastructure for years with endless patience?

"During the past 12 years that I have been here, our budget has doubled, thanks to three things: the royalties that we receive for our inventions. We have never used one shekel of them for expenses. It's all invested in science. The second thing is philanthropy. The third is research scholarships. Our scientists are magnets for these scholarships, receiving budgets from all over the world for their research studies. We don't lack for money. Even from Israeli sources, including the National Foundation for the Sciences."

You don't lack for money?

“I don’t like to complain. One must do, not complain.”

Wait, if the government offers you to increase its participation in the Weizmann Institute budget, would you refuse?

“Obviously not. I have things to do with more money here and it will pay off in the long run in a big way, not always in an expected manner. The history of Israel has proven this. Let’s not talk about ourselves, take the Technion for a moment. Can you imagine Israel without the Technion’s engineers? They say that scientists waste our time and money, they sit and study whatever they want. They forget that 85% of my students work in industry. It’s an enormous influence. The Weizmann Institute’s output is not only in research and academia. Look at the students who graduate from here. Almost all of them move to industry. Look how much the country benefits from this.”

HUMANITY WILL PREVAIL

You are 60 years old. The president of Weizmann Institute. You’ve reached the pinnacle of a coveted career. What’s next?

“I mustn’t look at it like that. The pinnacle of my career is in the laboratory. Always in the laboratory. Now I am a servant. Nothing else. I must not become confused. It’s not good for the president to believe that he deserves something because of his achievements. I have come to serve the system. It’s an opportunity, it’s a privilege, not the culmination of one’s career.”

What satisfies you more? The special moment of discovery in the laboratory that you described, or leading and navigating the flagship of Israeli science and excellence?

“It depends. I am a man of challenges. When I see fire, I run in. It’s hard to shake this tendency. I want to prove to myself that I can solve the problem. I like the image of the swimmer who enters the pool every day for many hours. That’s life. It’s hard for me to determine what brings me the most satisfaction – working with students and running the Institute, or conducting an experiment and being the first one to see a particular result. Even if it’s not so important. You are still the first person to see this finding, this signal in your laboratory, alone in the middle of the night. And

suddenly, you realize that you have learned something new about nature and you are the first. And at that moment, on that night, for a second you feel like God. You are the only one who knows. And what do you want to do at that moment? Of course, run and tell your friends."

At the Weizmann Institute, you are involved in bringing pupils closer to science, especially in the periphery. Are you concerned about the younger generation's addiction to digital screens, at the expense of reading or thinking?

"It's hard for me to know where this will lead us. Four hundred years ago, Gutenberg invented the printing press. He made books accessible to everyone. People said that it was the end of literature. Once literature meant sitting down, writing, copying, all by hand and suddenly this simplification. Everyone could print a book! Four hundred years later, who was right? I don't know what is behind these screens that consume our children's time. Maybe it's the new printing press. I'm generally optimistic. I trust that humanity will prevail. This concern reminds me of the current concern over the subject of artificial intelligence."

How is that related?

"In Europe, they are very worried that artificial intelligence will steal many jobs. Bus drivers, taxi drivers, workers will be replaced by robots. In the U.S., there are a million and a half truck drivers. They will need to find jobs one day. I am reminded that a hundred years ago your great-grandfather worked in the field and gathered potatoes in the sun by himself. Then came the tractor, and he was left without a job. Was it good or bad? What happened to great-grandfather? He understood that he must study because that is the requirement."

"Many times, technology just propels education forward. There is an adjustment period, but people understand that they must move to another occupation that is less manual, which requires different professional training and academization. Artificial intelligence will not replace you as a writer. No machine will write for you. So I don't know what will happen with children and screens, but I can say that the young scientists and students who come here are already part of the beginning of the screen generation, and they are just as good as those who preceded them, perhaps the opposite is true. They may be even better."

Do you share the concern regarding what we are doing to the planet?

"Yes. There is the political argument that the subject of global warming was stolen. I'm not there. The existing data and basic facts are undeniable. Forget the warming for a moment. There is extensive pollution of the Earth, and that is worrisome in and of itself."

So, is it an existential threat?

"It definitely is in the long run."

"We want a generation wrapped in cellophane that doesn't want to cope with all the opinions and isn't familiar with all the sides? I want a critical generation, which will listen to everything, which will form its own opinion. That's a healthy society. Whoever tries to isolate the academic system from the political discussion is crazy."

THE JEWISH GENIUS

What would you say to those who claim that the Weizmann Institute is a bubble? Detached from its context and environment?

"It isn't a bubble. Weizmann Institute doesn't have to be an ivory tower. It must be a lighthouse. It is a tower and that means the door at the bottom is narrow and not everyone can enter. And they shouldn't enter. But we must have enough energy in order to generate a light that will illuminate the environment. We need such a tower, which is a bubble to a certain extent that will enable people to think and investigate things that do not pose an immediate problem. We also need such people, in order to invent the future. We need this particular isolation, this bubble, this tower of light."

Are you successful in protecting this bubble? Politics is always trying to make its way inside, like the involvement of Science Minister Ofir Akunis in annulling the appointment of Professor Yael Amitai because she signed a petition years ago.

"True. It's a problem. It doesn't matter if it's right wing or left, there will always be political attempts to infiltrate, and it's dangerous. Not because politics is unimportant. We need political discourse. I am in favor of political discourse."

Is there political discourse at the Institute?

"I am not a politruk. People talk about whatever they want here. I do not restrict anything."

Aren't you worried that tomorrow they won't approve your scientist for a particular position, only because he signed a petition? They still may discover that you were a member of *Hashomer Hatzair*…

"There is something to that. In recent years, a desire to handle sustainability problems can be identified. Sometimes, there are problems and exaggerations in the system. The problem is that collective punishment is used. Like the attempt to introduce an ethical code. I vehemently opposed this step. An ethical code is necessary in the military not in a university. It's a different system. Fortunately, at the moment, this has been suspended. Professor Asa Kasher formulated something, but it wasn't accepted."

In your opinion, what is bad about the ethical code?

"I think it's a very dangerous thing. You actually need people to think what they want at university, for them to encounter different opinions. These people are mature enough. If someone, no matter what political side, voices a particular opinion in a lecture, they will know how to cope with it. These students have already been in the army, they are not children. Do we want a generation wrapped in cellophane that doesn't know how to cope with all the opinions and is not familiar with all the sides? I want a critical generation, that will hear it all, form its opinion on its own, that will agree, or disagree. That's a healthy society. Whoever tries to isolate the academic system from any type of political discourse is crazy. That cannot happen in a democratic country."

What worries you about the future of the country?

"The Jews survived for thousands of years; it appears that nothing has changed. But I am worried about the violence. Not necessarily physical violence, also verbal violence. It's a terrible concern. It creates unhealthy elements, an unhealthy discourse – it's toxic and disturbing. It can easily lead to fascist regimes, because people believe that the discourse must be restricted as well as the freedom

of speech and then it's a slippery slope. There is a simple solution to this. It's genius, perfect. It's called education. It's an amazing solution. It's inexpensive, it takes a short period of time and solves everything. If only we would invest in this field. I'm not talking about scientific education. I speaking about the concern for large portions of society that are unable to receive proper education. And it can be done."

Is this what you would do as Minister of Education?

"Yes, I would go to the periphery. Everyone talks about it and few do it. At the Institute, we have adopted Ofakim as a special project. We have invested a great deal there. It's possible and it costs very little, relative to the outcomes, believe me."

What actually is the problem?

"It's simple: Children in the periphery do not receive the options that children in Tel Aviv have. They grow up in the system and understand that they have no options. They are held back and restricted and that's where the violence begins. This must be remedied at the source, from the beginning. We took one place and you see the amazing youth, the desire, the ability, the wisdom. You must just speak to them at eye level, without condescending, not as someone coming from the Weizmann Institute. You've come to work. You learn just as much there."

Will we still bring home Nobel Prizes to Israel?

"Of course. I am not party to the prophesies of doom on this subject. I see people here, not only from the Institute, with phenomenal abilities. There are people that will receive the prize because they deserve it. By the way, when Ada Yonat who works with us received the award, no one was surprised. It was obvious for some years that she deserved it and there are others like her."

How do you explain the enormous percentage of Jews who are recipients of the prize?

"There are two answers. One is a joke that I heard from a Jewish Nobel Prize laureate, from Stanford University. When I asked him how is it that 25% of the prize recipients are Jewish, he said that its due to antisemitism. Why? I asked, and he answered that if not for antisemitism it would be 50%. But seriously, in my opinion it is related to the Jewish culture. Let's go back, to the Talmud. One of the building blocks of Jewish thinking is the need to ask questions. To debate at length, to argue, to differ in opinion, to conduct never-ending discussions, to be skeptical. This argumentation, endless commentaries are part of the Jewish culture and are exactly the growth engine for research and science, it's what we have been talking about this entire conversation."

"What must a good scientist do? Ask questions. Constantly. And when he receives answers, he must look for what's not okay, what's not right, where we erred. To perseverate. Perseveration is a Jewish thing. A lack of respect for authority, from the beginning of our conversation, leads to questions, skepticism, striving for excellence. It's a bad thing when one is waiting in a line, it's bad on the road and wonderful in the laboratory. It has no connection to knowledge, to results on high school exams, to discipline. I don't remember what I learned in high school. I do remember the values I was taught in *Hashomer Hatzair* in Belgium. It's the Jewish genius, non-acceptance of authority, endless discussions, being a leech and continuing to ponder and think. All the time."