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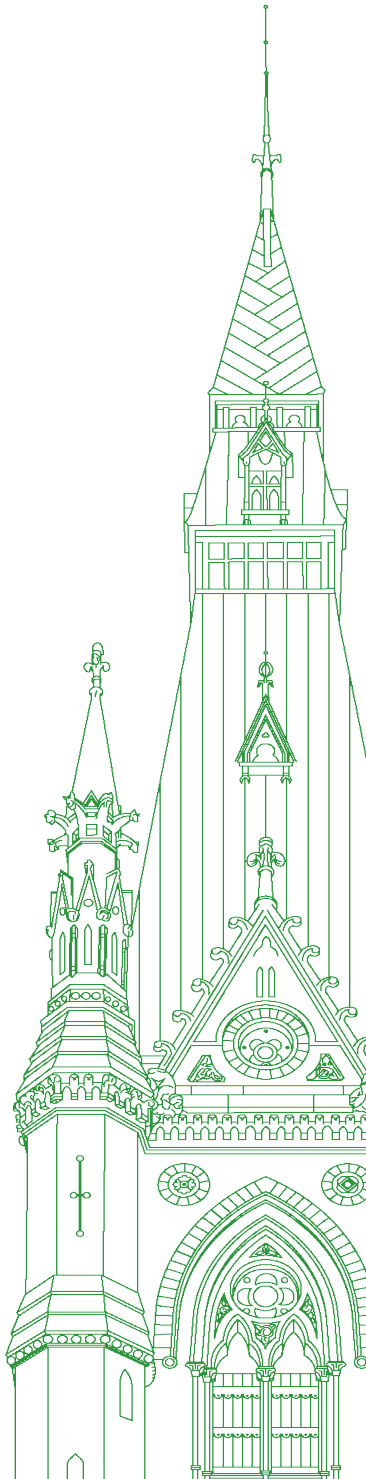

Chair: The Honourable Kirsty Duncan

Standing Committee on Science and Research

Thursday, February 2, 2023

● (1100)

[*English*]

The Vice-Chair (Mr. Corey Tochor (Saskatoon—University, CPC)): I call this meeting to order.

Welcome to meeting number 27 of the House of Commons Standing Committee on Science and Research. Today's meeting is taking place in a hybrid format, pursuant to the House Order of June 23, 2022. Members are attending in person in the room and remotely using the Zoom application.

Pursuant to Standing Order 108(3)(i) and the motion adopted by the committee on Monday, September 26, 2022, we are beginning our study of citizen scientists.

I would like to take a few moments to make a few comments for the benefit of the witnesses and members. Please wait until I recognize you by name before speaking. For those taking part by video conference, click on your microphone icon to activate your mike, and please mute yourself when you are not speaking. For interpretation, for those on Zoom you have the choice at the bottom of your screen of floor, English, or French. For those in the room, you can use the earpiece and select the desired channel.

I remind you that all comments should be addressed through the chair. For members in the room, if you wish to speak, please raise your hand. For members on Zoom, please use the "raise hand" function. The clerk and I will manage the speaking order as best we can, and we appreciate your patience and understanding in this regard.

In accordance with our routine motion, I am informing the committee that all witnesses have completed their prior connection tests in advance of the meeting.

I'd like to welcome our two guests today. Online we have Dr. Nemer, and in person we have Dr. Quirion.

We're going to start with opening statements from each witness, and we're going to go in the room to start off.

Dr. Quirion, I welcome you to take the floor for five minutes. At the tail end of the five minutes, if you could attempt to look up, I will try to get your attention to speed it up if you're approaching that magical five-minute mark.

With that, I'll turn the floor over to our first witness.

[*Translation*]

Dr. Rémi Quirion (Chief Scientist of Quebec, Fonds de recherche du Québec): Mr. Chair, members of the committee, colleagues and friends, I am happy to be back with you. Thank you for the invitation.

Today, I have chosen a somewhat unique and possibly slightly provocative angle to talk to you about participatory science and citizen engagement, so I am going to give a very brief summary of the initiatives undertaken by my office and the Fonds de recherche du Québec in this area. I will focus on three of our programs: *Audace*, *Dialogue*, and *Engagement*. I will be speaking mainly about the *Engagement* program.

One of the main triggers that prompted us to develop our citizen science strategy relates to disinformation, misinformation and fake news. I have been very concerned about these phenomena for several years, so it started well before the COVID-19 pandemic. Of course, it was all exacerbated with the pandemic.

How do we combat fake news and disinformation? How do we counteract them? It is not simple, as we all know, but it is truly essential for our democracies.

A number of studies show that increasing scientific literacy, that is, providing life-long science education, is one of the most effective measures for combating disinformation. We must therefore urgently increase scientific literacy in Canada. We are all working on this together, but we must do a lot better.

We should also be offering our fellow citizens of all ages better education about social media and how they work, so that everyone is really able to choose the most reliable sites. The fact that a site is at the top of the list of results when you do a Google search does not necessarily mean it is the best one. It is therefore very important to have better education on all aspects of this.

So how can citizen engagement and participatory science help to combat disinformation? What approach do we use at the office of the Chief Scientist of Quebec? Our *Engagement* program has existed for about three years and invites our fellow citizens to submit ideas for research projects to us. We then meet with the people who have proposed them, and we put them in touch with researchers who are interested in the subject in question and have expertise in the field. Then they train a small team that will work together to develop a much more detailed version of the project, something that often takes six to 12 months.

Next, the project is evaluated by a peer committee that includes members of the public. For the projects that are funded, we grant funding on the order of $50,000 over two years, and the researchers and individual members of the public work together to ensure that the project produces results. The way we build science and develop our arguments, the advancements, setbacks and uncertainties—it is all very important, increases scientific literacy, and helps to combat disinformation and fake news.

One of the primary objectives of the *Engagement* program is better understanding of the scientific approach. Participants in the program are very proud of their projects and become valuable spokespersons for explaining science, research and scientific data where they live: in their families, in their communities, and, very often, in the media and to you, our members of Parliament.

● (1105)

So it is one small step, but it helps us to advance our battle against disinformation and the lack of scientific literacy in Quebec. We hope to be able to ensure that over the coming years, programs like this will be developed all over Canada.

Thank you.

[*English*]

The Vice-Chair (Mr. Corey Tochor): Thank you so much for your testimony today.

Now we will go online and hear from Dr. Nemer.

[*Translation*]

Dr. Mona Nemer (Chief Science Advisor, Office of the Chief Science Advisor): Good morning, everyone.

[*English*]

Thank you, Mr. Chair, for giving me the opportunity to discuss with you this important subject today.

As a society we find ourselves today renegotiating many of our systems and institutions that were affected by the trials of the past three years. Going forward, we need to consider citizen science as an integral part of our strategies for empowering individuals and communities, for building trust in our institutions and for sustaining our democracy.

Citizen science, which is also called participatory research and which is a collaborative approach to research between public volunteers and professionals, operates in a variety of disciplines with a common value being that it opens up the scientific enterprise to people beyond the professional communities.

In the past 10 years alone, citizen science has helped to make advancement in several fields, including space, the environment, agriculture and health. The discovery of five new exoplanets, achievement of the first crowdsourced redesign of a protein widely used in synthetic chemistry, help in designing ways to prevent the COVID virus from entering cells and the discovery of entirely new aspects of the earth's magnetic field are examples of things to which citizen science has contributed.

[*Translation*]

Clearly, participatory research can be enormously beneficial for science. It can help us meet our data needs, support multidisciplinary collaboration and promote open science objectives by encouraging public involvement. But it can also be enormously beneficial for individuals, communities and society as a whole.

By opening up science to non-professionals, we can enhance science literacy and improve public understanding of the evidence used to make policies. We can help to equip people with the tools they need to identify and resist misinformation and make informed decisions about their lives and their communities.

[*English*]

Around the world, countries and jurisdictions are adopting and supporting citizen science initiatives, and I salute the work that is being carried out in Quebec by my colleague Rémi Quirion.

Both the U.S. and the European Union currently fund major projects. In fact, since 2017, the U.S. has had a Crowdsourcing and Citizen Science Act, which aims to promote innovation through open and voluntary scientific collaboration. Australia, too, has implemented a citizen science association. Germany has created a federally funded and centralized platform to promote it. The Netherlands implemented a process to facilitate the input of citizens and scientists in the Dutch research agenda, and Belgium has done something similar.

These are all very promising initiatives that are helping to connect people around the world to their communities, environment, and the science and innovation enterprise. Here at home, we have some citizen science initiatives, both within and outside of the federal government, and they are doing great things.

● (1110)

[*Translation*]

The federal citizen science portal currently lists 55 projects across the country, from *Abeilles citoyennes*, which collects data on pollinator species in Quebec's agricultural regions, to the Colony B online game in which players grow and identify diverse clusters of bacteria that contribute to research on the human microbiome.

Within the federal government, the Public Health Agency is engaging people through FluWatchers, an initiative in which volunteers help to track influenza and COVID-19 in Canada.

And Agriculture and Agri-Food Canada is supporting Canada's first Indigenous-led living lab. This laboratory brings farmers, Indigenous people and scientists together to define what the future of healthy and sustainable farm ecosystems can look like.

[*English*]

Building on these projects, colleagues at Health Canada are leading a multidisciplinary interdepartmental initiative reflected in Canada's fifth national action plan on open government. The aim is to promote citizen science through a framework that supports capacity building, as well as the required governance and infrastructure.

[*Translation*]

Canada would be well served to introduce citizen science early in school curricula. It is an effective way to raise scientific awareness and training in an inclusive manner, as well as encourage greater participation. Doing so would also be in keeping with the 2019 G7 science advisors' recommendation that countries rethink their scientific education and equip students to be able to undertake either participatory or professional research later on.

[*English*]

The Vice-Chair (Mr. Corey Tochor): Dr. Nemer, thank you so much, but we're over our time allotment. I appreciate what you've shared so far, and we'll have an opportunity to expand on that a little bit once we get into the questions from our members.

First off, we have our six-minute round. To start off, from the Conservatives, we have MP Lobb.

Mr. Lobb, you have the floor.

Mr. Ben Lobb (Huron—Bruce, CPC): Thanks very much.

My first question is for Mr. Quirion.

What is the potential, in your mind or in your vision, for citizen scientists?

● (1115)

Dr. Rémi Quirion: I think there are a lot of opportunities there.

We're lucky, I'll say, in Canada—in Quebec, in my case. There is a lot of interest in science, how science is built, from our citizens. Compared to some other countries, there is a lot of interest, so it's a matter of connecting, making connections with them, of academics in universities, in colleges and in the private sector linking with citizens and asking them what they think. Often, they have great suggestions, great ideas. We get a lot of projects. Every time we have a project competition in environment, in health, in arts and culture....

They say, for example, "There's a lot of blue algae in the lake. We did not used to see that. Why is that? Can we work with scientists on that?" Then citizen scientists, they do the project like that. In Montreal, women on the street, homeless women, started a research project to try to help these women so that they could get back to a bit more of a normal life.

I think there are a lot of opportunities. The key, for me, is to treat them as equals. It's not someone like me with a Ph.D. above them and they work, in a sense, for me. No, they are really equal, codesigners of the project. That's very critical.

Mr. Ben Lobb: Again—and if I missed this in your statement, I apologize—from a funding standpoint, across Canada, what would you say the amount of investment is in these types of projects?

Dr. Rémi Quirion: I don't know it for the whole of Canada. It's still small. When we started to think about the program, one of the things was that we need to give some money for support that is enough so that they can do the project with the scientist, the collaboration scientist. However, also, often many of them don't have much revenue, so we also need to support them in that, because sometimes they will take a few days off or they are a partner in a clinical study. We have to support them.

In Quebec, at the moment, it's a few million—about $3 million a year—that we spend on Fonds de recherche du Québec. On the national scene, I don't know. Maybe my colleague Mona would know more than I, but it's still small. As Mona said, I think in the U.S. and the U.K. there's more of a longer tradition, I'll say, of citizen science. If there's one thing we need to keep in mind and learn from the pandemic, it is that citizens can be a part of helping the whole community.

Mr. Ben Lobb: I'm sure one of the things that's a frustration for a citizen scientist.... If I think back to my area, which is a rural area, there are a lot of naturalists and farmers and so forth who have lived on the farm their entire lives or they've been near a green area, and they may have a very sharp knowledge of different things, whether it's rain patterns, weather patterns, trees, crops, frost, whatever it is. They may be a lot sharper than some of the university students or researchers, but their knowledge isn't peer-reviewed.

Is this what you're saying: that you can take the knowledge of a group of farmers in a region, couple them with somebody, and be able to have a peer-reviewed document? Is that the idea?

Dr. Rémi Quirion: Eventually.

Basically, the key thing.... The first time we launched the call, we did that too quickly. They submitted proposals, and we linked them with scientists. Then they started the project.

Now they submit the project, and for about six months, sometimes a year, they interact with the scientific community to express their knowledge, to explain their knowledge to the academic community. They build the program together. They work together. If there is a publication at the end, both of them are part of it. It's not just the scientist. You give them reward, in a sense, and they are very proud.

I must say that every time we support teams like that, the scientific community, of course, is happy about it, but I'm more impressed by the citizen who became.... They'd say, "I had an idea. I had some knowledge. They listened to me, and now we work together," and they continue. After the end of the project, they continue to work together. That's something we need to nurture in the future.

Mr. Ben Lobb: Yes, I can think back a long time ago in the field of crop farming and no-till drilling, and using certain types of, I guess, non-traditional farming practices 40 years ago. It was a group of farmers not far from where I grew up that worked with the University of Guelph and perfected no-till drilling for crops in southwestern Ontario, I would say.

I would also say that I can see where there could be potential for this in the areas along our Great Lakes and other watercourses throughout the country. My neighbour, for example, goes out every day. He represents the Lake Huron coastal conservation area and he takes the temperature of the lake. He reports that back and they put that in. They know roughly where he is and they can monitor it. I can see how there will be tremendous advantages as they accumulate these data points.

Is this something you would see as a benefit across the country?

● (1120)

Dr. Rémi Quirion: Yes, for sure.

I'm coming from a very small village in the Lac-Mégantic area—Lac-Drolet. It's not me. I was not involved in any of the proposals or peer reviews or whatever. Lac-Drolet had an *engagement*, a grant, citizen-proposed, in terms of the quality of the water in the lake. Now there are about 25 of them in a small village. They're working on that and take samples of the water and the temperature of the water, and all of that, every day. It's extremely useful for the Ministry of the Environment, for example, to have that.

The Vice-Chair (Mr. Corey Tochor): Thank you very much.

We're out of time, but thank you for those rounds of questions and answers.

We're moving on to the Liberals with MP Collins. You have the floor.

Mr. Chad Collins (Hamilton East—Stoney Creek, Lib.): Thanks, Mr. Chair.

Welcome back to our witnesses.

I would like to start with Dr. Nemer. Your opening sentence caught my attention as it relates to your comments around citizen science and sustaining our democracy. Actually, I should reference that Dr. Quirion mentioned disinformation and misinformation in his opening. We've heard a lot of information from past witnesses in other studies about disinformation and information floating through, of course, social media—where else would we find that—with an attempt to undermine not just science but public health initiatives and information that has helped us get through the pandemic.

I was a member of the board of health on my municipal council before I arrived here. I experienced those comments and the push-back to public health professionals who were trying to assist, whether it was on the use of masks, the social distancing or the benefits of getting the vaccine. We've seen this constant trend, since the beginning of the pandemic, to try to undermine the efforts of the science that helped us get through the pandemic. Scientific initiatives have helped over the last 30 to 40 years to get us to where we are today.

With that preamble, Dr. Nemer, I want you to further elaborate on how citizen science helps us with sustaining our democracy. I think those were your comments in your first sentence.

Dr. Mona Nemer: Thank you very much for this question.

Citizens make decisions every day. That, of course, affects our institutions and our democracy. It's very important that they be able to judge the integrity, validity and quality of the information, and the quality of the evidence. We can also put all of these into the sentence on the scientific method, which is going about in a rigorous, analytical manner proving or disproving your hypothesis.

This, in many ways, is what citizen science also teaches you. It's not only about gathering information and data. You have to do it in a way that's consistent and is going to end up being representative. If you generalize conclusions, then you have to be sure that this is actually reflective of everything.

It's all of these things that you learn to question that will help to tell you if something is true information or disinformation. You're going to be able to question the integrity, the source and the method by which the information is being disseminated and has been gathered.

Mr. Chad Collins: Thanks, Dr. Nemer.

Dr. Quirion, can I ask you the same question, please, along the same lines?

Dr. Rémi Quirion: Maybe I could add a bit. I talked about scientific literacy. Certainly, one way is to increase scientific literacy all across Canada. I think we saw that with the pandemic.

It's very important to do that from day one, almost in primary school. Young kids are very curious. They want to learn things, so to explain a bit—of course, with simple words—what science is and the fun of science.... It's not only that it's hard, tough and difficult, but that it's fun to do science. You keep doing that with teenagers, because at that point, it's a bit more challenging with some of them. There are some who believe in that and who have fun in science, even though they find it hard, so finding ways to interest them in science....

Throughout life, I think it's the duty of government—local, provincial and national—to offer opportunities to increase scientific literacy here in Canada and, I hope, all over the world. It's key to democracy, I think.

● (1125)

Mr. Chad Collins: Thank you for that answer.

My next question would be for Dr. Nemer. I think you referenced some other examples internationally of funding models and strategies that have been used by different levels of government around citizen science.

I'm accustomed to—if I use my hometown as an example—in Hamilton, dealing with the Hamilton Naturalists' Club, which has been around for over 100 years. I know that they're always competing for a patchwork of government grants and trusts that might make monies available for citizen science initiatives. It seems like we, maybe, don't have as much of a formal process as those that you referenced in your opening statement.

Can you compare and contrast the funding models that we have here in Canada and how we're supporting citizen science, versus those that you've listed in the U.S. and in Europe?

Dr. Mona Nemer: I'll say that we're still at an embryonic stage in terms of supporting citizen science. We've historically supported investigator-initiated research in universities, in government departments, of course, and in the private sector. We're starting to include community-based research and community-led research.

I think that we have to put in place the platforms that we need to do this matchmaking. We need to properly fund the human resources that go with this. There are field trips, computing and data analysis. There's the time of the professionals who are engaged with the communities, with the citizens and with the population in general.

We need to go at it in a more systematic manner than we have so far. It can be encouraged as part of much of the targeted research that we do, or just crowdsourcing. Try to solve a problem, see where the best ideas come from and open it up, as well, to citizens—people who are not in formal settings, but who are collaborating or are prepared to collaborate with more formal training, if you want.

The Vice-Chair (Mr. Corey Tochor): Thank you so much for the testimony.

Thank you, Mr. Collins, for the questions.

Now we're moving on to the Bloc. I'll cede the floor to MP Blanchette-Joncas.

[*Translation*]

Mr. Maxime Blanchette-Joncas (Rimouski-Neigette—Témiscouata—Les Basques, BQ): Thank you, Mr. Chair.

Today we are lucky and very pleased to have the Chief Scientist of Quebec and the Chief Science Advisor of Canada with us. Welcome.

Mr. Quirion, you talked about the importance of increasing scientific literacy among the public. Can you explain how initiatives like the Réseau francophone international en conseil scientifique, which you were in charge of launching last fall— congratulations, that is a great accomplishment—can contribute to the objective of citizen science?

Dr. Rémi Quirion: Thank you for your question.

The objective of the Réseau francophone international en conseil scientifique is to expand the capacities for giving scientific advice to elected representatives and senior officials all over the francophone world, in the francophone countries of Europe and Africa and in Canada, including Quebec, of course. By expanding those capacities and the connections between the academic world and elected representatives and senior officials, we are indirectly facilitating everything associated with citizen science or participatory science.

Elected representatives, parliamentarians, will hear more about science and scientific advice. Since they will be familiar with citizen science, they will be able to discuss it with the people in their ridings, to find out what should be done.

In addition to Quebec and Canada, we would also like to have comparisons at the international level, in particular regarding climate change, sustainable development and the global pandemic we are all familiar with.

● (1130)

Mr. Maxime Blanchette-Joncas: Thank you, Mr. Quirion.

How does the development of francophone science diplomacy worldwide benefit the general public?

In the fall of 2022, as I mentioned a little earlier, there were a lot of promising initiatives during the second annual Semaine mondiale de la Francophonie scientifique, including the manifesto for francophone science diplomacy signed by the members of the Agence universitaire de la francophonie. Quebec and Canada have signed the manifesto, of course.

What can you tell us about the benefits that these efforts can bring about?

Dr. Rémi Quirion: We are used to talking about diplomacy of a more political or cultural nature, but science knows no borders. We work in teams all over the world. For example, the Palestinians worked alongside the Israelis on CERN's particle accelerator in Geneva. So science diplomacy consists of using science and researchers to open doors all over the world, the francophone world in this case. Science diplomacy is now part of the vocabulary of my authorities in Quebec, and I am very proud of that.

Mr. Maxime Blanchette-Joncas: Thank you, Mr. Quirion.

When I look for francophone science diplomacy vocabulary in the federal government, I would say it occurs very seldom, if at all.

As the Chief Scientist of Quebec, do you think the federal government is coming through when it comes to international francophone scientific cooperation?

Dr. Rémi Quirion: It is increasingly coming through.

My colleague Mona Nemer and I do a lot of things together. The Réseau francophone international en conseil scientifique was launched in partnership with Ms. Nemer's team. Her team will also participate in the forum on science in French to be held in Quebec at the end of April, even though that is a bit different.

We have to keep pushing to raise the level of recognition of science in French.

Mr. Maxime Blanchette-Joncas: That's excellent. Mr. Quirion, you can count on me to keep pushing, obviously.

Could the federal government do more in this regard? We understand there is collaboration, but are there expectations on the part of the Chief Scientist of Quebec?

Dr. Rémi Quirion: We could certainly do more and forge more ties with the three federal funding councils, in particular for Quebec's Fonds de recherche. We can always do better, from an overall perspective.

Mr. Maxime Blanchette-Joncas: Thank you, Mr. Quirion.

Ms. Nemer, Mr. Quirion mentioned that you were there in the fall of 2022 when the Réseau francophone international en conseil scientifique was created. However, from the checking I have done and my numerous searches, there has been no communication on this subject from your organization, the Office of the Chief Science Advisor of Canada, or from the various federal departments.

As well, what explanation is there for the fact that there has been no communication from your organization after the signing of the manifesto for francophone science diplomacy?

Dr. Mona Nemer: I would first like to point out that the office I hold is very different from the one held by my colleague Mr. Quirion in Quebec. In addition to advising the government, he is responsible for the funding councils and therefore has some authority in respect of the research, the science, and the associated spending.

That is not the case for me. My role is to advise the government. In my first annual report, I advocated science diplomacy everywhere in the francophone countries. I believe that Canada has a golden opportunity, together with Quebec, to be a world leader in this area.

Obviously, we have departments that are responsible for the various aspects of our international relations, but I believe that we are increasingly realizing that we, as a country, are very strong in science and we have to use science in our international relations and everywhere that it can advance the public interest and the interests of...

● (1135)

[*English*]

The Vice-Chair (Mr. Corey Tochor): Thank you kindly for that.

We're moving on to the last of the six-minute rounds with MP Cannings.

Mr. Richard Cannings (South Okanagan—West Kootenay, NDP): Thank you to both witnesses for being here today.

As a matter of full disclosure, this study was my idea and I'm glad we're doing it. I think it's very important. It's good to hear some of the initial discussions. My full disclosure is that I used to work in the citizen science world before becoming an MP. At least that was part of my world, both as a professional scientist and as a citizen scientist, so this is something that's very dear to my heart.

I just wanted to bring up some things that Mr. Lobb said. There are citizens out there who are on the land every day—whether they're farmers, fishers, hunters or birders—who are experts in their own right. You can think of citizen science as ordinary citizens doing things for real scientists who just need a lot of bodies across the country. That's one aspect of it. In many cases, the people gathering this data.... I come from the bird biology world. Most of the keen birders out there know a lot more about birds than bird biologists, so it's really valuable to engage them.

I just wanted to perhaps direct a question to Dr. Nemer about the work that some of these groups do, whether they're NGOs or people participating directly in federal government programs. Can she maybe tell us something about the scope of these things?

One real value of citizen science is that it can happen over decades. We have citizen science programs that have been going on since the year 1900. They take place all across the continent. That sort of data is impossible to gather from just a single lab.

Dr. Nemer, maybe you can expand on some of the programs that the federal government itself uses to gather important data for its work, whether it's in environment, weather and climate, or things that are important to Canadians, which really rely on citizen science.

Dr. Mona Nemer: Thank you for the question.

Mr. Chair, allow me to express my admiration to MP Cannings for the extraordinary work he's done to promote citizen science. I think we're reaping the benefits of what he started and we need to amplify it.

A number of examples that I listed include a lot of work in terms of the biodiversity—whether it's the birds, the bees or the lakes—in terms of health.

Maybe I'll step back for a second and say that when we talk about citizen science, very often we think about data gathering. Data gathering is absolutely part of it. It is essential and it really enhances the repertoire of the information we have, especially in a country like ours, which is so immense. There's no way we could have information about every corner of the country.

There are other examples as well that really don't depend on data gathering, but actually on sort of playing with the data to provide solutions or to create, as I said, structures for proteins. This is important because it allows development of a drug or medicine for certain diseases. I think we have to appreciate people's imaginations and how astute they can be in terms of using the data for things that others have not thought about.

I just want to give you an example, if I may. During the pandemic, one of my youth council members started a project to basically gather information about PPE littering in nature, along the coast. She developed an app called Marine Debris Tracker. She got many other people involved in this. Actually, it's now funded by National Geographic.

We can have programs that are funded by our own government, and we can also have important programs that link internationally and are funded by international organizations.

● (1140)

Mr. Richard Cannings: Thank you.

Dr. Quirion, I'm really interested in the program you alluded to where people can suggest scientific efforts, become involved with scientists, develop that and get funding. You mentioned, I think, monitoring blue-green algae in lakes. Are there other examples of that? I'll perhaps let you expand on those.

Dr. Rémi Quirion: First, I congratulate you and advise you that I will use you as a poster boy for citizen scientists and that scientists can become MPs. That's quite amazing.

Yes, there are many other examples. We could send you more information on that. One is a woman on the street in Montreal who talks about the homeless and how we can probably work together with the help of scientists so that they get better, they can get back to work and they can get housing somewhere. That's a great program. The woman in charge is just amazing. She's fabulous. There are many examples like that.

Mr. Richard Cannings: Thank you.

The Vice-Chair (Mr. Corey Tochor): Thank you.

Now we're going to move on to our five-minute round.

For the Conservatives, we have MP Mazier.

Mr. Dan Mazier (Dauphin—Swan River—Neepawa, CPC): Thank you, Chair.

Dr. Nemer, my questions are for you today.

Your mandate includes, and I quote, “advising on ways to ensure that scientific knowledge is considered in public policy decisions and that government science is fully available to the public”.

Has the government asked you to produce any scientific reports or advice on the impact that reducing fertilizer emissions by 30% would have on Canada's food production?

Dr. Mona Nemer: The short answer is no, not on that particular topic.

Mr. Dan Mazier: Okay, thank you.

Have you personally seen any scientific reports or studies to suggest that the government's 30% fertilizer emissions target can be met without decreasing food production?

Dr. Mona Nemer: I can tell you that, if we want to go seriously about our targets, we're going to need to consider actions in many different sectors, including agriculture, transportation and housing, but I think that, in terms of agriculture and agri-food, there are huge opportunities for the country.

I think we need to change our behaviour in terms of food wastage. There are great areas of potential innovation in terms of agriculture, precision agriculture, and we can reap all the benefits of the genomic revolution and even traditional knowledge, which we talk about a lot. We know how we integrated with other things and determined how we can decrease a lot of the fertilizers we're using by enhancing the soil in a natural manner. I think that science can support us in incredible ways in this.

Mr. Dan Mazier: You have not personally seen any scientific reports or studies to suggest that the government's 30% fertilizer emissions target can be met without decreasing food production. Is that correct?

● (1145)

Dr. Mona Nemer: I have not.

Mr. Dan Mazier: You have not seen any science on that.

Dr. Mona Nemer: Well, I haven't seen any report on that.

Mr. Dan Mazier: Okay, that's good. Thank you.

Can you please share with this committee what specific reports or activities we should expect from your office this year?

Dr. Mona Nemer: This year we're going to be updating the guidelines for science advice and evidence. We should be putting out an interim report on the science for impact assessments. We're going to be looking more carefully—

Mr. Chad Collins: Mr. Chair, could I just raise a point of order?

I'm not certain what the relevance is in terms of citizen science. Certainly these are scientific questions, but today's topic of discussion is citizen science. I would just ask that we refocus our energies on what's in front of us and why we invited the witnesses to committee today.

The Vice-Chair (Mr. Corey Tochor): I would view the questioning in order, because we are dealing with science and a science-related topic. I would not rule that point of order in order.

Mr. Mazier, I'll let you continue. You have a minute and 29 seconds.

Mr. Dan Mazier: That's excellent.

Can you please share what activities you're going to do and reports you're going to produce this year, please, Dr. Nemer?

Dr. Mona Nemer: We're going to put out a report on managing long COVID, the post-COVID conditions—

Mr. Dan Mazier: I have more questions here, so if you could please table those, that would be great.

Dr. Mona Nemer: Okay. That's great. We can do that.

Mr. Dan Mazier: What are the consequences if the government fails to engage with citizens when developing policies that impact them?

Dr. Mona Nemer: First of all, the government represents the people, and the people and the government need to continue to work together towards bettering the country.

Mr. Dan Mazier: What are the consequences of that, though, if they don't?

Dr. Mona Nemer: If they don't, there is a loss of trust, and the loss of trust in institutions and in government can be quite costly and can erase a lot of the benefits that otherwise can accrue from all the efforts that both the government and many parts of the public actually work towards.

Mr. Dan Mazier: Since you were appointed to the role of chief science adviser, have you ever witnessed a political decision that has gone against your scientific advice?

Dr. Mona Nemer: I have provided advice on many things but not on all things, so it's a difficult answer, really, to give you. I can tell you that in the cases where I have provided advice, I have felt that my advice was taken into consideration.

The Vice-Chair (Mr. Corey Tochor): Thank you so much, Dr. Nemer and MP Mazier.

Now we go to our newly elected MP, MP Sousa.

Mr. Charles Sousa (Mississauga—Lakeshore, Lib.): Thank you very much. Thank you both for providing your presentations and information relative to this issue.

What are some fields of research in which we could actually use more support from citizen scientists, to which they're not necessarily contributing today? In other words, are there areas in which we could embellish or nurture certain aspects of what's being done? A follow-up question to that would be how you would get them involved as a result.

Dr. Rémi Quirion: I could start and then Mona could continue.

Mr. Charles Sousa: Mr. Chair, I'd like to share my time with MP Diab as well. Thank you.

The Vice-Chair (Mr. Corey Tochor): You have four minutes and 21 seconds left.

Dr. Rémi Quirion: Certainly there's everything related to sustainable development. That's a huge topic. There's a lot of interest from citizens—at least that has been our experience in Quebec—related to climate change, but this is much larger than that. On the circular economy, for example, we could use quite a bit more input from the public in cities and regions and all of that. Certainly it's an area in which we could use the knowledge but also the brains of all citizens to help scientists reach their objectives and also to help governments to reach their objectives in terms of the circular economy, for example.

Maybe Mona could add to that.

Mr. Charles Sousa: Yes, Mona, how would you invite them or how would you engage them to be part of it?

Dr. Mona Nemer: I agree that the environmental area is very ripe for this, particularly on biodiversity. We could double our efforts there, but we could, as well, think about other areas like, for example, monitoring pollution and even monitoring how well we're doing in terms of our actions. Citizens could equip their cars or their homes with detectors that tell you how much pollution there is in the air. There are some examples of that in coastal areas.

I want to go back to agriculture, because I think agriculture is a great area in which a lot of science and knowledge has been gathered, and I think we can do a lot more there. It would have ripple effects in terms of encouraging young people to get interested in agriculture and agri-food, but also in terms of combining all these years of tradition and knowledge with modern scientific tools and possibilities.

● (1150)

Mr. Charles Sousa: It's over to MP Diab.

Ms. Lena Metlege Diab (Halifax West, Lib.): Thank you very much to my colleague, MP Sousa.

To both our witnesses, welcome back.

It's always a pleasure to have you both here with us and to get your knowledge and expertise in these areas.

I was listening intently. For me, when I first heard the term that was brought up by Mr. Cannings, “citizen scientists”, to be honest I wasn't really sure what it meant. I'm glad we're here, and I'm glad for the information you gave us, Monsieur Quirion.

[*Translation*]

You spoke a lot about the *Engagement* program, which tries to combat disinformation in social media by making it possible for the public and researchers to work together. I believe that is very important.

[*English*]

For both of you, the question I have, and I know you have talked about this, so I will brief, is how we can get more Canadians involved in science in their communities, and what role youth can play in developing citizen science.

What can you share with us on this committee that we can work towards?

Dr. Rémi Quirion: I think increasing scientific literacy is a way to increase the participation of citizens in scientific research, at least one way.

The other way is to have more support, more programs and more funding for citizen science. I often prefer to call it participatory science. That may be a bit easier to understand than citizen science.

The Vice-Chair (Mr. Corey Tochor): Dr. Nemer, go ahead quickly.

Dr. Mona Nemer: I would say that as we encourage participation, we really need to be cognizant of vulnerable populations and those who are excluded generally. This is why starting very early on and in collaboration with schools and education allows us to make sure we don't leave anybody behind. Science is for everyone, and we need to give access to citizen science to everyone in the country as well.

The Vice-Chair (Mr. Corey Tochor): Thank you so much.

Now we go to the two and a half minute round. We will go to the Bloc with MP Blanchette-Joncas.

[*Translation*]

Mr. Maxime Blanchette-Joncas: Thank you, Mr. Chair.

Ms. Nemer, I am going to continue what I was saying earlier concerning the manifesto for francophone science diplomacy. One of the themes of the manifesto, which Canada signed in November, is promoting francophone scientific publications.

I'd like to know whether your organization has considered that. Is there a plan of action in place to promote francophone scientific publications in Canada?

Dr. Mona Nemer: I am happy to answer that question because, among all the important work done by my office, we have a plan for open science, which is very important, in both French and English.

In cooperation with partners in Quebec and France, in particular, we are also in the process of exploring the possibility of developing systems for translating all the documents into French, not solely from French to English, to enable francophones worldwide to read scientific publications in the language of their choice. The modern tools now make it possible for us to do things that might have been more complicated before.

● (1155)

Mr. Maxime Blanchette-Joncas: I'm eager to see that. I will be following it closely, Ms. Nemer. If you had information to share with the committee, I would be very pleased to be able to see it.

You talked about citizen science, participation, and mobilization. Recently, during the committee's studies, we talked about research and scientific publication in French and we were forced to observe that there is unequal access to knowledge for francophone communities in Canada and, obviously, in Quebec. At present, there is unequal access to opportunities to influence how knowledge is mobilized.

Currently, French is virtually absent from the sciences in Canada. How can we think about mobilizing citizens and the public using science, if science is expressed in a language that doesn't reach a quarter of the population? How do we go about interesting and mobilizing a community if that community does not have direct access to the scientific documents in its common national language?

[*English*]

The Vice-Chair (Mr. Corey Tochor): I'm sorry to announce that we're out of time, but, to the witnesses, please submit a written response to the question from MP Blanchette-Joncas.

Now we go to the NDP member of Parliament, MP Cannings, for two and a half minutes.

Mr. Richard Cannings: Thank you.

I'd also like to direct my question to Dr. Nemer.

Dr. Nemer, you mentioned indigenous participation in some of these programs, and I mentioned the fact that one of the advantages of citizen science is that we can gather long-term datasets. Obviously, the longest-term dataset we have is the traditional knowledge indigenous peoples hold under a paradigm different from western science, perhaps.

I'm wondering whether you can comment, in a couple of minutes, on how the federal government integrates indigenous knowledge with science, in order to make sure we capture the extraordinarily important knowledge they hold.

Dr. Mona Nemer: Thank you very much for this question, which is very important indeed.

In my office, we're working to develop, if you will, best practices on how to do this. Of course, knowledge gathered by indigenous communities belongs to the indigenous communities. They're the holders of the information. We need to engage, build trust at the start and develop ways that are agreeable to the communities sharing the knowledge...and under which terms.

I must say, though, that weaving together indigenous knowledge and knowledge gathered from western science is extremely important if we want to provide proper evidence on which to build policies in many areas. I would say it's a work in progress. In my group, we have a researcher in residence who comes from the indigenous communities.

Within the Government of Canada, we have help to develop what we call the I-STEM cluster—indigenous and STEM. We're working with indigenous scientists so we can be guided on how to get to a stage where we have both knowledge systems informing our policies.

The Vice-Chair (Mr. Corey Tochor): Thank you so much to our witnesses. Thank you for being here today.

We will now suspend briefly before moving to our next item of business.

● (1155)

_____(Pause)_____

● (1200)

The Vice-Chair (Mr. Corey Tochor): Colleagues, we are now pleased to welcome the Minister of Innovation, Science and Industry, the Honourable François-Philippe Champagne. The minister will be speaking and answering questions on two of our studies: research and science publications in French and the international moon shot programs.

After the minister's opening statement we will follow the usual order of questioning. Members are welcome to ask questions in relation to either study or both.

Before we begin, I'm going to also allow the minister to introduce his other guests and senior officials with him.

With that, Minister, I will turn the floor over to you.

● (1205)

Hon. François-Philippe Champagne (Minister of Innovation, Science and Industry): Mr. Chair, you are very kind. I'm sorry for my voice, I've been talking a lot these days.

Why don't we start with introductions?

Ted, do you want to introduce yourself? It will probably be easier if we go this way, just to the group and my colleagues.

[*Translation*]

Dr. Ted Hewitt (President, Social Sciences and Humanities Research Council): My name is Ted Hewitt and I am the President of the Social Sciences and Humanities Research Council.

[*English*]

Dr. Alejandro Adem (President, Natural Sciences and Engineering Research Council): I am Alejandro Adem, president of NSERC.

[*Translation*]

Mr. Francis Bilodeau (Associate Deputy Minister, Department of Industry): My name is Francis Bilodeau and I am the Associate Deputy Minister at Innovation, Science and Economic Development Canada.

[*English*]

Mr. Iain Stewart (President, National Research Council of Canada): I am Iain Stewart from the National Research Council.

Ms. Catherine MacLeod (Executive Vice-President, Canadian Institutes of Health Research): I'm Catherine MacLeod, the executive vice-president of CIHR.

The Vice-Chair (Mr. Corey Tochor): I'll turn it over now to the minister for five minutes.

Hon. François-Philippe Champagne: Thank you, Chair.

As you can see—

[*Translation*]

Mr. Maxime Blanchette-Joncas: Mr. Chair, I would like to get some clarification. The meeting is starting a bit late, and is starting with a round of introductions. I want to make sure that this won't cut into members' speaking time.

So I'm asking the Minister's agreement to having a few extra minutes, so that each member is able to ask their questions.

[*English*]

The Vice-Chair (Mr. Corey Tochor): Thank you, MP Blanchette-Joncas. I did talk to the minister and we're going to have a full hour once he starts. There will be no rounds missed.

I'll turn the floor back over to Mr. Champagne for his introductory remarks.

[*Translation*]

Hon. François-Philippe Champagne: Thank you, Mr. Chair.

I want to reassure my colleagues: we are here to answer their questions. The Standing Committee on Science and Research is probably one of the most important House of Commons committees. I want to thank each of its members for sitting on the committee.

Before starting my remarks, I would like to repeat what a scientist recently told me: today's science is tomorrow's economy.

I am pleased to be appearing for the first time before this committee, which is an essential one, given the importance of science, and especially of research, for Canada's future and prosperity.

As a member of a government that places great importance on science and on making evidence-based decisions, I am grateful for this committee's excellent work. I would also note that I supported creating this committee during the last session of Parliament.

Today, I am here to discuss two subjects of interest to members of the committee: research and scientific publication in French, an issue that interests me since I come from the Canadian education system in French myself, and international moonshot programs.

Our government has worked hard to support a robust science and research base in Canada and to ensure that we are prosperous and, certainly, that we are competitive. As is the case for all government policies and programs, the initiatives are based on the values of equity, diversity and inclusion.

Just as diversity is a major asset for Canadian research, our linguistic duality is our hallmark and adds to the diversity of ideas, connections and collaborations in Canada and on the international scene. We can all agree on that. As a former minister of foreign affairs, I can say that the fact that our country has two official languages is an essential asset in the economy of the 21st century.

Our linguistic duality also makes us a premier destination for French-speaking researchers worldwide, and that is a good thing. That is why we fund research and research training in either language and we encourage education in French, which is vital and very important to me, as we all know.

For example, grants to assist academic journals have been established to help in exploring innovative ideas and to cover the costs associated with publishing scientific articles. Numerous publications supported by these grants are in French or support the publication of research in French.

There are also science communication skills development grants that support organizations offering communications training for students, scholarship holders and professors in the fields of science, technology, engineering and mathematics.

The Natural Sciences and Engineering Research Council of Canada conducts two annual campaigns to promote the sciences: Science Odyssey and Science Literacy Week, both of which actively involve francophones and promote French-language content.

I am always ready to hear about new ideas and international best practices that allow for greater equity in the funding and distribution of research in French. I give you my word that we will continue doing our best to accomplish this.

[*English*]

That brings me to the other topic of interest at this committee, moon shot research. You kind of know me by now. I've been ambitious, and I want Canada to have the same level of ambition.

It is vital that we focus our attention not only on the immediate matters we are facing as a nation but also on the long-term challenges and opportunities we face as a society, and I would say, indeed, globally. I want Canada to lead. That's always where I put us when it comes to science, technology and innovation.

Never before in our lifetimes has the importance of science-led decision-making been so starkly apparent as during the COVID-19 pandemic. I would say, in a way, that Canadians have reconnected with science. Certainly, we all owe a debt of gratitude to the exceptional scientists across Canada and, I would say, the world, who have worked tirelessly to help us combat the virus.

● (1210)

[*Translation*]

To make sure that we are even better prepared for future health emergencies, the Government of Canada is making strategic investments in cutting edge life sciences and biotechnology research.

[*English*]

Colleagues, you will allow me to express with great pride that we have Moderna now, which has invested significantly in our country. When I started as minister, our fill and finish capacity on the vaccines was around 30 million doses. I think today it's fair to say that we're above 600 million doses.

[*Translation*]

We also have to make sure that we can accelerate the development and commercialization of world-class Canadian research on vaccines and treatments. We must also make sure that we have the essential research talent to build a more robust biomanufacturing ecosystem.

[*English*]

This is why the government launched the biomanufacturing and life sciences strategy, to ensure that Canada has the skills, the experience and the expertise to develop vaccines and therapeutics as a global leader in the life sciences field. The strategy is already showing success through our nearly $2-billion investment. We're seeing global vaccine producers coming to Canada.

Vaccines are just one. The government is generating big and bold ideas, as you've seen, whether it's quantum AI or cybersecurity, which I think are going to be key to the underpinning growth in our national economy.

Mr. Chair, I would have more to say, but I see that you are impatient and that colleagues are impatient to ask me questions.

I'm very pleased to be here.

[*Translation*]

Thank you for inviting me here today, ladies and gentlemen.

[*English*]

The Vice-Chair (Mr. Corey Tochor): Thank you for the presentation. It was a minute over, so we'll go to 1:07 today.

MP Blanchette-Joncas, there are no worries that you won't get your rounds in.

With that, we'll move on to the six-minute round, with MP Soroka kicking it off.

Mr. Gerald Soroka (Yellowhead, CPC): Thank you, Mr. Chair.

Thank you, Minister, for coming today.

I'll be talking more about the moon shot programs. I'm quite impressed that we're going to go down that road.

I'll start off with an easy one, and just remember to keep your answers as short as my questions, please.

Do you think funding in Canada for researchers and universities is acceptable?

Hon. François-Philippe Champagne: I would say, dear colleague, first that I think we can always do better. I am happy you're asking about the moon shot, because, whether you talk about the Lunar Gateway, the Artemis mission or, for example, the James Webb telescope, I think we're punching above our weight.

We need to continue to show excellence, and we need to put the funding behind it, because, obviously, you need to look at that on a comparative basis in terms of what our G7 partners are doing. We have been doing a lot, I would say. We've invested $14 billion since 2016.

If your question is, can we do more? Certainly. Are we looking at that? Definitely.

Mr. Gerald Soroka: The other day in The Globe and Mail, Steven Chase had an article that one of our top universities is collaborating on vital research projects with Chinese military scientists at the National University of Defense Technology, known as NUDT. The NUDT reports to the Chinese Communist Party's central military commission. One collaboration was on quantum cryptology on how laser interruptions can aid in eavesdropping.

Don't you think this kind of research poses a risk to Canada's national security?

Hon. François-Philippe Champagne: I would say that I'm glad you're asking the question. I wish the journalist had asked me the question.

I would say very openly to all Canadians that, first of all, this is concerning. It is unacceptable. Second, I've made my voice very clear at the university that I expect them to do more when it comes to sensitive research and IP. We have already adopted guidelines on research security. We'll have the security research centre to help them.

I can tell you today, as a piece of news, that I'm looking at imposing additional requirements when it comes to strengthening research security in Canada, because, to your point, we need to be eyes wide open and we need to ensure that sensitive research and our IP is adequately protected. When it comes to national security—and I think you know me by now—there is no compromise.

There'll be new guidelines issued very shortly.

Mr. Gerald Soroka: That article also says that the NUDT was blacklisted by the United States in 2015. Washington believes it involves or possesses significant risk.

That was the same year that this Liberal government was elected and for eight years you haven't blacklisted the NUDT like the U.S. did. For eight years, this Liberal government hasn't done anything about national security against the NUDT. Why not?

● (1215)

Hon. François-Philippe Champagne: With the outmost respect to our colleague—whom I admire in the House of Commons—you've heard me before. I'm not going to take lessons from the Conservatives when it comes to national security or science, sir, with respect.

I am the minister. You're looking at the minister who imposed the strictest conditions on research security. I will continue to do so because, as a former foreign affairs minister, I don't think there are many people who better understand what we need to do to protect our research and IP. I'm very committed.

I would think that, when it comes to national security, sir, it's not about a Liberal...or whatever. It's about us as parliamentarians doing what's right for Canada.

Mr. Gerald Soroka: That really didn't answer my question, though. You talked a lot about how we should be doing more and we're going to be doing more, but nothing seems to really have been done. Why not?

Mr. Stéphane Lauzon (Argenteuil—La Petite-Nation, Lib.): I have a point of order, Mr. Chair.

The Vice-Chair (Mr. Corey Tochor): MP Lauzon, you have the floor.

[*Translation*]

Mr. Stéphane Lauzon: Mr. Chair, we have waited a long time for the Minister's appearance and we have worked hard with Mr. Blanchette-Joncas to undertake two very important studies: research and scientific publication in French and international moonshot programs.

At this point, the questions relate to national security and so have nothing to do with our study. Can we get back to the subject at hand and ask the questions we have been waiting a very long time to ask?

[*English*]

The Vice-Chair (Mr. Corey Tochor): I will rule the line of questioning in order because we are talking about science, moon shots and the importance of why a country would do a large scientific investment without protecting it. I would rule the line of questioning in order.

I'll pass the floor back to Mr. Soroka for two minutes and 50 seconds.

Mr. Gerald Soroka: Thank you for that.

Minister, I'll go on to a different question, then.

Hon. François-Philippe Champagne: Do you want me to answer that question, sir?

Mr. Gerald Soroka: Sure.

Hon. François-Philippe Champagne: I would object to that. If you look at budget 2022, we invested $159.6 million for the implementation of the national security guidelines for research partnerships. We not only put guidelines out, sir, but we even put in money to back these guidelines to help universities. I'm having discussions with the granting councils and with the U15, which are the 15 largest universities in Canada.

Sir, there's no one more committed to protecting our IP and research. I'm sure you are the same. This is not a partisan issue. This is about protecting our country.

If we want to be the best in class in the G7 and in the world, we need to have proper guidelines. We're going to help the universities to do that.

Mr. Gerald Soroka: That's one of my next questions.

It seems like the universities are kind of floundering. They're not certain where the federal government stands. They don't have the money or financial means to continue doing this research, so they look to organizations such as the NUDT to get research done.

Why are they having to create their own policies or put in place their own safety protocols when the federal government isn't doing that for them?

Hon. François-Philippe Champagne: Based on my discussions, the U15 and others have been asking us to provide them with the guidelines. I think that's what they expect from their federal government. I'm sure you appreciate that this is a shared jurisdiction with the provinces and there are a lot of people in the ecosystem.

You're going to see in the next guidelines we'll be issuing that we're going to be enjoining universities across Canada to adopt similar rules to protect sensitive research and IP. I think this is in the best interests of Canada.

I can tell you that I am, with my officials.... You have the best people here in Canada who are leading with research and innovation and are truly committed to protecting our scientists and researchers. In order to do that, they're asking from us.... The guidelines we put in place last time, sir, were really a coordinated approach. With the recent event that you mentioned, we're going to do more because I am not happy. It's unacceptable. I've been saying that very clearly to them. We'll come out with additional guidelines. I think that's what they want.

That's also why we created the research security centre. In reality it's sometimes complex for them to understand that. They need to work with our intelligence agency.

I would say this is a team Canada effort to do what's best for the country.

The Vice-Chair (Mr. Corey Tochor): Thank you kindly, for those answers.

We now move on to Member Lauzon from the Liberals for six minutes.

[*Translation*]

Mr. Stéphane Lauzon: Thank you, Mr. Chair.

Welcome, Minister.

Hon. François-Philippe Champagne: Thank you.

Mr. Stéphane Lauzon: Like me, you are a strong defender of Quebec's French language. We are lucky to have a minister who not only comes from Quebec, but comes from a region that is strongly francophone.

You have with you today a whole team that represents the research field well. However, can you tell me what our government is doing to eliminate barriers to research in French, to support and promote the distribution of research in French, and to assist French-speaking researchers?

● (1220)

Hon. François-Philippe Champagne: Thank you. I am very glad to be asked that question. Yes, I come from Shawinigan. Because I did a large majority of my studies in French, I understand the importance of French in scientific research.

There actually is good news on this subject. I am told that a quarter of the reviewers on the Natural Sciences and Engineering Research Council of Canada and the Social Sciences and Humanities Research Council selection committees are francophones. I am also told that about 73% of the grant applications submitted in French are accepted. Our rate is actually higher than what we might expect. The reality is that the research councils are subject to the Official Languages Act. If you want to know more, my colleagues will be able to answer.

Personally, Mr. Lauzon, I make sure that I promote all of the initiatives. As I said in my opening remarks, there are various initiatives that mobilize francophones, not just in urban centres, but also in rural areas. We have to make sure that our programs encourage young people. We know that Canada's strength lies in our talent, today. If we want to prosper in the future, we have to focus on talent.

We are in the process of studying what is done elsewhere and we are finding that the situation is the same in Germany, Italy and other countries when it comes to the language of publications: English is used in a large proportion of them. That is also true in the other G7 countries.

We must therefore make extra efforts to support this process. I can tell you that this is a concern. In my view, this linguistic duality, which is important, is part of diversity. Even though these decisions are made by the research councils, our colleagues around the table are well aware of our interest and the role we play, as francophones. We have to be sure that all of the programs function, and even that translation of scientific publications is facilitated. There are policies, but we have also invested funds in this.

If you would like more details, I can ask Iain Stewart to tell you exactly what his council has done in this regard.

Mr. Stéphane Lauzon: We will come back to that at the end if we have time.

I also want to talk about what you did on January 13. I am talking about the launch of Canada's National Quantum Strategy, which represents an investment of $360 million. On November 28, as part of this study, Arthur McDonald, who received the Nobel Prize in physics in 2015, came to speak to us about Canada's important advantage when it comes to quantum research, primarily in the field of quantum computing. There were a lot of questions about that.

Do you think that Canada's National Quantum Strategy is considered by your team to be a moonshot project?

Hon. François-Philippe Champagne: Yes, very much so. I believe my colleagues at the United States Commerce Department realize that Canada really has a head start, particularly when it comes to artificial intelligence, the quantum field, and cyber security. That is important, because in the 21st century economy, all our other strategies, be they in the field of aerospace, electric vehicles, or the biopharmaceutical industry, to name just those few, will be supported by artificial intelligence, the quantum field and cyber security. I think this strategy has been applauded by Canadians, but everywhere on the planet.

I will give you a concrete example: Xanadu, a Toronto company that has the only quantum computer in the world that deals with battery chemistry. If you talk to the big auto manufacturing executives anywhere in the world, you will find that they all know about Xanadu. Why? Because Xanadu's quantum computer can save them three years of R&D on the batteries of the future.

These are the kind of examples we can offer. We also have D-Wave, and of course the C2MI innovation centre in Sherbrooke. They are accomplishing extraordinary things.

We are currently in talks with our colleagues in Washington to decide what projects we could work on jointly. Somewhat like between Windsor and Detroit, one thing I would like to see is a big corridor established between Albany and Bromont that would involve education and semiconductor research and manufacturing. It is a project that seems to be on track and I think there is going to be good news about it.

● (1225)

Mr. Stéphane Lauzon: So we can feel the strength of Canada's position. However, do we have this collaboration with all of the G7 countries, with which we can be an important player in exchanging information?

Hon. François-Philippe Champagne: In fact, I think that collaboration with allies and partners is the way of the future. We have done it in artificial intelligence with the Global Partnership on Artificial Intelligence, the GPAI. You will recall that France and Canada were the two founding countries of that organization for the advancement of artificial intelligence.

When I travel outside Canada, my colleagues realize that Canada is an important player in the quantum field. Competition is strong, however. So we have to continue to invest, and that is why we have adopted a national strategy to highlight our strengths and advantages.

[*English*]

The Vice-Chair (Mr. Corey Tochor): Thank you, Minister.

We'll move on to the Bloc and MP Blanchette-Joncas.

[*Translation*]

Mr. Maxime Blanchette-Joncas: Thank you, Mr. Chair.

Thank you for being here, Minister.

Canada is in the middle of a catastrophic language crisis in the sciences. Between 2000 and 2021, scientific publications in French in Quebec fell from 4% to 0.6%.

As minister, do you acknowledge the linguistic death throes that the sciences find themselves in, in Quebec and in all of Canada?

Hon. François-Philippe Champagne: I think this is a matter of concern. As I said earlier, we have examined the comparative data and this phenomenon also exists in Germany, Italy and Japan. There is a global trend toward publishing in English.

To reply to your comments, I think we have to do more in this regard, and that is exactly what I have asked of the teams. That is why we have made sure that there are quite a few francophones on the various funding councils.

I think the good news is the 73% acceptance rate for grant applications submitted in French. That means that the people who submit an application are receiving a lot of money...

Mr. Maxime Blanchette-Joncas: Yes, I'm very familiar with that statistic, Minister. You talked about the 73% acceptance rate, and the acceptance rates for applications in French are actually lower in other funding organizations.

However, the funding granted for research and publication in French is lower than what is granted for publication in English. In three funding bodies, funding for research and publication in French accounts for between 5% and 12% of the total amount, while francophones represent more than 20% of the total number of researchers. That means that 50% of francophone researchers are not publishing in French, for various reasons, including the lack of recognition or the lower value placed on research and scientific publications in French.

I am going to move on to another question now. Since you took office in your department two years ago, what concrete measures have you taken to ensure the survival of French in science? What is your vision of French in science in Canada?

Hon. François-Philippe Champagne: As I said earlier, I come from the francophone academic world. You will therefore understand that I am passionate about making sure that we can work and study in French. I do that not only through the work my colleagues do on the various funding councils, but also by adding my voice to yours and to my colleagues' when it comes to stressing the importance of promoting the role of French.

We are aware of the current global phenomenon, but I think we still have to be vigilant. We have to be capable of doing it. We have to promote our researchers who work in French. We have to make sure we are capable of attracting talent in French to our research institutes.

For example, I am thinking of Mila, an institute that has built a global reputation in the field of artificial intelligence. In fact, I have an anecdote about that. On his official visit to Canada, the German Chancellor himself chose to visit the Mila offices in Montreal, and this clearly shows the head start we have in artificial intelligence.

Mr. Maxime Blanchette-Joncas: Minister, I would like you to come back to my question about concrete measures. You talked about vigilance. However, the statistics show that only 0.4% of scientific publications in Quebec are in French. So vigilance is not producing results.

At present, French in the sciences is in its death throes. I hope you will be able to answer this question...

Hon. François-Philippe Champagne: I am open to your suggestions, if you have any.

Mr. Maxime Blanchette-Joncas: Perfect, so I am going to offer you my suggestions.

A number of witnesses have told us that it would be possible to have incentive criteria to make sure there is equitable representation of French, which is one of Canada's two official languages. That is the case at Telefilm Canada, for audiovisual production. It is also the case at the Canada Council for the Arts in the field of literature, to promote representation of francophone content.

Would the government and yourself, as the minister, be prepared to commit yourselves to instituting genuine linguistic diversity and substantive equality of the two official languages in the sciences, and, of course, to imposing language criteria, to ensure genuine representation of French in the sciences in Canada, as you do when it comes to equity, diversity and inclusion?

Hon. François-Philippe Champagne: I am prepared to listen to everyone who has suggestions. The goal is to do better, together. We are all parliamentarians here today.

I would therefore be happy to hear those of you who have good ideas about what we could do to improve the representation of French in scientific publishing. In fact, we are doing comparisons and looking at what is being done elsewhere, in France and Germany for example. I am always open to adopting best practices. I imagine that the committee chair will be submitting a report when the study is finished, and we are going to look at it carefully to study all your proposals.

We have made sure that there was good francophone representation on the evaluation committees and that a good proportion of francophones were receiving funds, but if there are better ideas, you know me and you know that I am always open...

● (1230)

Mr. Maxime Blanchette-Joncas: I'm going to continue, Minister, because time is passing.

Hon. François-Philippe Champagne: Go ahead.

Mr. Maxime Blanchette-Joncas: On the subject of the evaluation committees, you said that francophones represented one third of the members on the funding bodies. However, I would draw your attention to the fact that the people who make up those committees do a self-assessment of their language proficiency. I will give them the benefit of the doubt and assume that they are acting in good faith, but you understand that the fact that they took a French course that lasted a few hours in high school does not mean that they are fluent in French and are capable of evaluating a funding application in the sciences.

I now want to draw your attention to another good idea. The Government of Quebec has committed to funding the Service d'aide à la recherche en français, to assist francophones everywhere in Canada. That was a request from Acfas. For almost two years, Quebec has been supporting the development of scientific research in French outside Quebec. Where is the federal government in this? We don't get answers. I have questioned Mr. Vats, your Assistant Deputy Minister for science and research, and I have not received an answer. I would like to hear your views on this.

Hon. François-Philippe Champagne: I will be pleased to talk about it with Rémi Quirion. He is a great partner. We draw a lot on what is done in Quebec, because Quebec often has very good ideas when it comes to research, and certainly when it comes to the sciences and innovation. We work hand in hand with Mr. Quirion, who has sat on a number of committees that we have created.

If there are ideas that we can implement to improve the situation, we are open to that. That is why I brought everyone here this morning. It's good for me to hear you, but it is also good for all the people around the table. It gives us ideas for trying to improve things together.

Mr. Maxime Blanchette-Joncas: That is a good idea. To follow up on the status of French in the scientific community, would you be prepared to create a permanent committee to include the funding councils, the department, and representatives of civil society?

Hon. François-Philippe Champagne: We had initiated a study to find out how to do better in the sciences, and I recently received an analysis from Frédéric Bouchard, who will be submitting his report in the near future. I will be happy to talk about it with the committee. There are several recommendations. If you have a recommendation to make on this subject, I will be happy to look at it.

Mr. Maxime Blanchette-Joncas: Thank you.

How much time do I have left, Mr. Chair?

[*English*]

The Vice-Chair (Mr. Corey Tochor): Thank you so much. Time is up unfortunately, MP Blanchette-Joncas.

We are now moving to the NDP with MP Cannings for six minutes.

Mr. Richard Cannings: Thank you.

Thank you, Minister, for being here today.

At our last meeting about moon shots, one of our last witnesses on that idea was Dr. Alexandre Blais from the Université de Sherbrooke talking about quantum physics. One of the points he really emphasized during his talk about how we should do moon shots was that, before we could even think about it, we have to support our young scientists. You mentioned supporting young scientists yourself in your opening remarks.

However, while we are putting big money into big ideas, we seem to have left our young scientists completely behind in Canada. You have members from the tri-council here, and they provide valuable scholarships that keep these young people alive, basically, while they're doing their master's thesis, their Ph.D. or their post-doctoral fellowship. However, certainly for the graduate scholarships, those funding levels haven't changed in 20 years and these people are living in poverty.

When the Ontario science policy network did a survey in 2021, it found that 45% of respondents don't have enough to get by. They struggle financially every month with 87% reporting stress and anxiety about their finances. More than half are living with no savings at all. They found that 32% of graduate students considered dropping out of their program due to financial concerns.

We've been telling the government about this for a year now, it seems. I was hoping to see something in the fall economic statement about it. I'm praying that there's something in the budget coming up that will address this problem in a serious way. These people I think are 48% behind where they should be, had we kept up with inflation.

What I'm saying is that we can make it our first moon shot to make sure that our young scientists don't have to live in poverty and worry about that, and instead get on with their lives and do the good work that they need to do. We're losing 38% of our Ph.D.s overseas every year because conditions are better in every country except Canada.

I'm just imploring you to fix this and make it our first big moon shot.

● (1235)

Hon. François-Philippe Champagne: First of all, I would like to say thank you, MP Cannings, because you've been a big voice. I think we meet some of the same people. Thank you for bringing the human dimension to all that, because it's all about people, at the end of the day. I'm grateful for the work you're doing. I say that as a colleague who esteems you very much and what you're doing.

I am as preoccupied as you are in terms of the relative numbers we've seen and where we need to be and where we are. Trust me. I'm always raising my voice to do more for our students, for our graduates. It's certainly something we're looking at. You're quite right. We have made record investments, since 2016, of $14 billion, but we need to also measure the relative performance in terms of these grants to the students. I'm very well aware of the statistics. I can assure you that it's something I take very seriously. I think Canada's success in the future depends on talent, and talent is the young people you talk about. We've met the same people. I think we were together in some of these fora.

I'm very sensitive to that. As you appreciate, I don't have the last say in all of that, but certainly it's something that is very top of mind. I want to thank all the young Ph.D. students, researchers and graduates who are coming to Canada. We're still a big magnet for talent, I can tell you. If we've been able to attract the likes of Stellantis in Canada, BASF, GM and POSCO, they realize....

Of the five things I say, the first thing is always about talent. We are a magnet for talent. We need to continue to be, and I'm grateful for your help in making sure we achieve that.

Mr. Richard Cannings: I just would add that whenever we lose young people to other countries, that's a loss. We have trained them and spent big money, and as some of the people have pointed out, we're losing in the order of $640 million a year in lost training talent. We have spent that money training someone who then goes to the United States, the U.K., Germany or wherever to carry on that work and work on those countries' big scientific challenges, their moon shots.

That's my one ask. I will perhaps get back to other things, but that's the one point I want to make in this round. Please, let's support our young scientists before we go off spending.... I'm all for moon shots, but let's do this right before we go on to other things.

Hon. François-Philippe Champagne: I would say, MP Cannings, that it's top of mind for me, as well. I'm grateful that you're with me on that, and that we think about the human dimension of science. I think it's very important. I think everyone here would agree. I think we're in violent agreement on this one.

Mr. Richard Cannings: Right. Okay.

Hon. François-Philippe Champagne: If we want to do more, we need to do more. We are grateful for these young scientists, and certainly we're looking into that.

Mr. Richard Cannings: Okay. I will watch the budget carefully.

The Vice-Chair (Mr. Corey Tochor): Thank you, MP Cannings, for being so on top of your time.

We will move on to MP Mazier for five minutes.

Mr. Dan Mazier: Thank you, Minister, for coming out this morning—I guess it's afternoon now.

Minister, during this study we've heard from experts on how nuclear energy is important for Canada's economy and environment. You mentioned that you want Canada to lead. Do you want Canada to lead when it comes to nuclear energy?

Hon. François-Philippe Champagne: Definitely. If you want me to expand, I've been talking to.... We've done a number of things in the SMR field in Canada—as you would know as a colleague—with the CANDU. You know my previous business background. I'm very familiar with the technology that is in South Korea and many places in the world. I think that's something we should be able to promote and that we should be behind. I think the SMRs, small modular reactors, are a great way, for example, to help communities develop resources in more remote locations. I've been talking to a number of Canadian companies. We've been financing some of these projects across the nation, and certainly I am very optimistic as to what we can achieve together.

Mr. Dan Mazier: Okay. Good.

Are you aware that your government excluded nuclear power from the green bond framework?

Hon. François-Philippe Champagne: Yes, I'm very familiar with that. I think the answer to that for Canadians is that it is not up to Canada to create the definition. As you know, in international finance, these are definitions that are agreed to globally or internationally. You can call yourself whatever you want, but to qualify for the green bond under the markets, it has to meet certain criteria. That's my understanding of why that was not included. However, on the other hand, are we supportive? Are we putting money behind nuclear? Definitely.

● (1240)

Mr. Dan Mazier: Are you aware that your government's current environment minister tweeted, “Japan says 'sayonara' to nuclear energy; can't wait for us to do the same!”

Hon. François-Philippe Champagne: I would say that I was in Japan recently, and we've been discussing.... I've been in Japan three times in the last six months to work with our allies. I can tell you, in the minds of leaders around the world, it's food security, energy security and supply chain resiliency. I think our Japanese colleagues are looking at what more we can do together. I've been meeting the CEOs of a number of Japanese companies who want to do more with us.

Mr. Dan Mazier: Are you aware of that tweet?

Hon. François-Philippe Champagne: I would say with respect, sir, that I have pretty busy days, so I don't spend a lot of time on Twitter.

Mr. Dan Mazier: Just so that you are aware, he did tweet that.

Are you aware that General Fusion, the only fusion energy company in Canada, is choosing to build a $400-million energy plant in the United Kingdom instead of Canada?

Hon. François-Philippe Champagne: I'm more than aware, because I was part of the discussion with the CEO, who I have in my speed-dial. We talk on a regular basis.

The reason behind that, sir, if you want, is that, in fusion, I think we have a leading edge, and, if we want to win, we have to go fast and we have to go at scale. The best way to do that is with allies. I can tell you, just to say between us, sir, I was with the U.K. secretary yesterday to talk about what more Canada and the U.K. can do to promote that great technology, because there's not really competition between us. That's not where the competition is, but if we team up, we can go faster.

Mr. Dan Mazier: Don't you think that, if your government's environment minister supported nuclear energy, these investments wouldn't be leaving our country?

Hon. François-Philippe Champagne: I'll tell you that, from my perspective, sir, I see more CEOs calling me to invest in Canada than ever before, so that's not my perception of the market. The CEO of Westinghouse called me. I can tell you that I was with Terrestrial's CEO, whom I've met recently. All of these people know me. We talk regularly. That's not my feeling.

Mr. Dan Mazier: You don't think his statements have any impact on what's coming into—

Hon. François-Philippe Champagne: I'm telling you what I hear from CEOs, and they're very keen to partner. I was with SMRs.... We did that, as you know, in New Brunswick. We did that with the CEO of Westinghouse. I talk to all of them, and they seem to be pretty keen on investing in Canada.

Mr. Dan Mazier: We've had multiple witnesses talk about connectivity, the importance of moon shots, gathering data and stuff like that.

The Liberals promised to lower cellphone bills by 25%, and you claim that this government has achieved this. Do you actually believe this?

Hon. François-Philippe Champagne: It's from Stats Canada, sir. I believe what Stats Canada publishes.

Mr. Dan Mazier: It says, “Government of Canada” right here.

Hon. François-Philippe Champagne: It's data from Stats Canada. I do believe what Stats Canada publishes.

Mr. Dan Mazier: Do you believe that the cellphone bills have reduced by 25%?

Hon. François-Philippe Champagne: I'll tell you two things. I believe the Stats Canada data, and I also believe that we need to do more.

You know me by now. I've been after these guys quite a number of times. We need more affordability, more competition and more innovation, and every decision I've taken since I've been minister has been pushing them and holding their feet to the fire to provide better rates for Canadians.

Mr. Dan Mazier: Thank you.

The Vice-Chair (Mr. Corey Tochor): We'll move on to the Liberals.

MP Bradford, you have five minutes.

Ms. Valerie Bradford (Kitchener South—Hespeler, Lib.): Thank you, Mr. Chair.

Thank you, Minister Champagne, for taking time out of your busy schedule to join our committee today. I know that you're extremely busy.

Thank you, also, to all of the other witnesses who are here with you today. It's very important.

Getting back to the area of talent, we know how important it is to have equity, diversity and inclusion at our post-secondary institutions and the representation of life experience in the research being produced.

Can you tell the committee about the measures your department and the government are taking to ensure that diversity is a key driver in Canadian research, for example, gender diversity and ethnic diversity?

Hon. François-Philippe Champagne: Totally, and I'm very grateful to a colleague like you for asking that question, because equity, diversity and inclusion are part of everything we do. In a sense, concerning the tri-agency equity, diversity and inclusion action plan, not only do we talk about it, but colleagues around this table—like you said, esteemed colleagues—do amazing work. They have an action plan in place to make sure that we have more diversity.

We know that diversity leads to excellence, and it's not just me saying that. If you look at data around the world, having more women, more young women.... We've been trying to do that in STEM and have a number of initiatives to bring more women into STEM. We've also been funding Black researchers, as you say. We've put that forward.

We're always looking to do better, and I think this is something that is key for all of us. I think that colleagues around the table could tell you about their specific initiatives, but we do have an action plan, because this is core. This is not just the right thing to do; it's the smart thing to do if we want to succeed. I think everyone recognizes that, when you bring in more people of diverse backgrounds, you get better outcomes.

● (1245)

Ms. Valerie Bradford: Thank you very much.

Canada has made a lot of progress in the last few years in advancing research and science in Canada. Can you walk the committee through some of the highlights and accomplishments from our government in science and research from the last few years?

Hon. François-Philippe Champagne: One of which I am most proud.... When I started as minister—and I think I alluded to that when I did my first comments—our capacity in biomanufacturing was wanting, and thanks to the good work of Iain Stewart, who is here, we now have a biomanufacturing facility. We wanted private and public facilities. We have the likes of Moderna, and Sanofi came.

For me, when I had that role, there was nothing more important than protecting the health and safety of Canadians. Like I said, we didn't choose the pandemic. We don't know what may come next, but we chose to be better prepared. I think this is probably a legacy for generations. We invested about $2 billion to be more resilient, and I think that is something significant.

I also think of the Artemis mission in space. Canada is going to be the second nation in the world to have someone who is going to go around the moon. That's a big thing we should all be proud of. I was talking to Hon. Marc Garneau, and I said I wanted the next astronaut to go to inspire a generation. I said, “Marc, you inspired me when I was young, and I want the next astronaut we have to inspire the next generation.”

We're going to go to the moon. The plan is to go beyond to Mars, and Canada is at the centre of that mission with NASA. It is amazing what we achieved. The James Webb telescope, we're part of that initiative. We've been doing great things, and I think the world is looking to us to partner with that, and I'm very proud.

Obviously, we can always do more. We're looking at that. We've done great things on genomics. We are doing great things on quantum, like I said, and in artificial intelligence, but what I want is to have world-class moon shot projects that the world will recognize. We're negotiating our Horizon Europe with the European Commission. I just hosted the EU commissioner in the last few days, and we talked about that because we're going to be part of the largest research project probably in the world, or at least in Europe. This is where Canada belongs. We belong at the head table, and that's my vision. It's always to lead, to have the best and certainly to push on talent.

Ms. Valerie Bradford: Yes, I believe Canada's always punched above its weight in the area, certainly, of aerospace. When the Avro Arrow got cancelled, a lot of our aerospace engineers wound up in NASA. That was a great tragedy because it set us back for generations.

As they say, let no crisis go to waste, so I agree with you that, on COVID, the biomanufacturing is key. A lot of us were upset that Connaught Laboratories had been sold off and privatized, and we didn't have that capability, so I'm glad we're on that.

There's one more thing. We have been successful at creating funding programs that link researchers, post-secondary institutions and industry together to drive innovation and breakthroughs in research to solve some of the most pressing challenges. Certainly with moon shots that would be very important.

Can you talk to the committee more about the government's vision for creating these partnerships and strong roots in communities across the country?

The Vice-Chair (Mr. Corey Tochor): I'm sorry, we're out of time, but I'm sure Minister Champagne would be okay with a written submission.

Ms. Valerie Bradford: Yes.

Hon. François-Philippe Champagne: I would just say that Mitacs is part of the answer, where we bring a lot of young people into internships.

The Vice-Chair (Mr. Corey Tochor): Now, moving on to our two and a half minute round, we'll have MP Blanchette.

[*Translation*]

Mr. Maxime Blanchette-Joncas: Thank you, Mr. Chair.

Minister, you said earlier that the shift to English in the sciences was also happening on the international scene, particularly in France and Germany. I am quite aware of that. However, there is a marked difference between the situation in those countries and ours, and that is what I want to draw your attention to.

Here, the shift is not to a foreign language, which is neutral; rather, it is to another national language, the effect of which is assimilation. This needs no further proof, since your government is the first to recognize the decline of French in Canada.

I want to understand. From your point of view, are you fully cognizant of this situation?

Hon. François-Philippe Champagne: I understand it well; I live in Quebec. You are talking to someone who is very aware of this situation.

We are also monitoring best practices elsewhere in the world. What I want to say to Canadians and to Quebeckers is that this is not a Canadian phenomenon, it is a global phenomenon. However, we are trying to see what we can do.

The difference in Canada is that this transfer is happening to another official language of the country. We are also studying the rate of publication in German as compared to publication in English in Germany, and we are trying to understand the levers we can use in a similar situation. As I say, I am open to ideas.

● (1250)

Mr. Maxime Blanchette-Joncas: Thank you, Minister.

So I am going to review the ideas I have already submitted and add a bit more. I hope your colleagues will be able to take note of them and draw on them extensively.

We have to take a look at the self-assessment done by reviewers at the funding councils of their own language proficiency, to make sure they are truly bilingual and truly understand French.

We could fund the Service d'aide à la recherche en français as Acfas has requested and as the Government of Quebec has already been doing for almost two years.

We could implement linguistic incentive criteria for the Canada research chairs. You are doing that at present on issues of gender and underrepresentation of people of various ethnic origins, but at present no language criteria are applied to funding of the Canada research chairs.

We can also create a permanent committee to monitor the language situation in the sciences and the status of French in this field.

In 2016, your department created the Advisory Committee on Federal Support for Fundamental Science, the Naylor committee, which produced the report entitled "Investing in Canada's Future: Strengthening the Foundations of Canadian Research". You can do the same thing in French.

Hon. François-Philippe Champagne: We have already done it. I would inform you that Frédéric Bouchard is the chair of the Advisory Panel on the Federal Research Support System. In fact, I met with him the day before yesterday. He is a francophone from Montreal and we talked specifically about the language issue. I am extremely sensitive to these issues.

Mr. Maxime Blanchette-Joncas: Thank you, Minister.

We also have to increase the funding for the university presses and academic journals in French, and make that funding stable.

On that subject, I would like to take advantage of your presence here to make two requests, that I would like the Minister to respond to in writing.

The first is to provide the committee with the number of funding and scholarship applications in French and English, in Canada's francophone and bilingual universities, broken down by university and funding body, for the last 20 years.

The second request concerns the funding granted by each funding body to each Quebec university over the last 20 years.

Hon. François-Philippe Champagne: If the information exists, we will submit it to the committee.

[*English*]

The Vice-Chair (Mr. Corey Tochor): Thank you kindly.

We will get a written submission to his question.

[*Translation*]

Hon. François-Philippe Champagne: I hope we have had the time to take notes of Mr. Blanchette-Joncas' requests, because he speaks quickly.

[*English*]

The Vice-Chair (Mr. Corey Tochor): We'll now go to the NDP and MP Cannings for two and a half minutes.

Hon. François-Philippe Champagne: He spoke so fast.

The Vice-Chair (Mr. Corey Tochor): We have it on tape. Don't worry.

Mr. Cannings, your two and a half minutes start now.

Mr. Richard Cannings: Thank you.

Minister, I would like to turn back to moon shots.

I keep hearing on the radio and reading in newspapers and magazines, that the moon shot of our time is the fight against climate change. We can talk about AI, quantum, hydrogen and all of those things, but that's what we really have to put our efforts into and not just redouble but make 10 times...really increase our ambition and efforts.

One of our witnesses here, on the moon shot study, was Seth Klein. You may have heard of his work. He wrote a book called *A Good War* that compared what Canada did in the Second World War to what we need to do for climate action. He showed what we can do if we put our minds to it, and we found some of that out during the COVID pandemic. He outlined all the ways Canada tackled real difficulties during the Second World War and did amazing things, and he put down ways we should and could tackle climate change here in Canada.

I wonder whether you, as the minister of everything, have discussed this with your colleagues. Have you considered what we should be doing? We have to do a very great amount more than what we are doing on climate change.

Hon. François-Philippe Champagne: MP Cannings, I agree with you again. I wish I had read his book, but I look forward to reading a copy.

Mr. Richard Cannings: I will loan you mine.

Hon. François-Philippe Champagne: He's probably listening today. I will buy a copy and read it.

To your point, I would say that investment in AI is helping climate change, because, with AI, we can do the modelling for climate change better, for example. I think about quantum—I'm giving you examples where I think these technologies are cross-sector. With quantum, for example, we say we can develop better materials and save time developing these materials. In a way, we're helping the planet, because if we have a more sustainable economy it helps everyone.

I agree with you totally. That's the direction I have been given. The biggest moon shot project we have is climate change, but there is a lot of definition around that. Even when you invest in AI, you're indirectly investing. The Space Agency investment we made on monitoring the ozone project is helping that. RADARSAT through the Space Agency is helping with climate change. Climate change is across different things. I think these investments are helping, in that sense.

I agree with you. I'm always mindful that this is the biggest challenge we have. We always have that in our minds as we look at these investments.

● (1255)

Mr. Richard Cannings: I will quickly say that, without putting words in Seth Klein's mouth, I think what he would say is that we need a C.D. Howe to bring all of this together. Yes, we're doing AI, and everything feeds into it, but we need some very coordinated action on the part of government.

Hon. François-Philippe Champagne: I'm doing my best. That's what I can say to the question.

The Vice-Chair (Mr. Corey Tochor): Thank you, MP Cannings. We are already over time by 47 seconds.

We'll move on to MP Lobb for five minutes.

Mr. Ben Lobb: The first question is in regard to the National University of Defense Technology. Have you been able to ascertain how many graduate students have studied at Canadian universities?

Hon. François-Philippe Champagne: Like I said, I find the recent articles and facts brought forward unacceptable. I am concerned. That's why I said the university needs to do more.

We published security guidelines recently, and we even put money behind that, but I think you will shortly see additional guidelines in order to get to the bottom of that.

Mr. Ben Lobb: It's probably fair to say we're unsure how many potential research students are operating now, or have in the past.

The other thing I want to ask you goes back a couple of years. I'm sure you're familiar with the term “the Seven Sons of National Defence”. These are universities located in China with ties to the Chinese military technology area. They are banned in the United States. I'm sure you and Mike Pompeo talked about that, in your time.

Are there research students from the Seven Sons of National Defence currently doing research at Canadian universities?

Hon. François-Philippe Champagne: I'm not familiar with the term you're referring to, but I can say that we are actively looking at putting in additional guidelines.

As you can appreciate, my jurisdiction is through the councils, but we're looking at something that would capture more universities because that's a shared jurisdiction with the provinces. Universities also get private funding. In the working group we have between Ottawa and universities, they've been asking us....

Like I said, when it comes to national security, we work together to provide guidelines.

Mr. Ben Lobb: Does anybody keep a database of these university students who are studying in Canada?

Hon. François-Philippe Champagne: I certainly am not familiar with whether there is a database of that sort. I can tell you that we are working with the universities now on new guidelines.

I'm as concerned as you, sir. I look at these things as a former foreign minister. I understand these things back and forth. That's why, when we saw that the first time, I said that it's unacceptable. We're looking at best practices. The guidelines we issued were the first in Canada, I would say, to have very strict guidelines.

If you'll allow me, for Canadians who are watching, we also want to capture universities that would not be through the granting councils. We want to issue things that we hope all universities would adopt as best practices to make sure we protect sensitive research and IP in Canada.

Mr. Ben Lobb: Okay.

Is anybody up here on the panel today familiar with the Seven Sons of National Defence, and are they studying at Canadian universities?

Ms. Valerie Bradford: I have a point of order.

Mr. Chair, I really feel that, since we have such limited time left, it would be nice if we could keep it to moon shots and French research.

Mr. Ben Lobb: With all due respect, Mr. Chair, Ms. Bradford did bring up the Avro Arrow, so relevance could be questioned there as well.

The Vice-Chair (Mr. Corey Tochor): There's latitude at committee to allow people to ask questions and mention subjects that are close. I think the example is an astute one. Bringing up a cancelled air defence program is similar to this.

It's Mr. Lobb's time, so he will have two minutes and 20 seconds to complete it.

Hon. François-Philippe Champagne: MP Lobb, in all fairness, I think you should have the security agencies come here to answer that question, if you want. I think it's fair to ask that of civil servants who are heading—

Mr. Ben Lobb: It's a good point, but if you read different articles, this is just what occurs. It's passing the buck around.

● (1300)

Hon. François-Philippe Champagne: Sir, look at the guy in front of you. Who's issuing the security guidelines? I issue the security guidelines. I'm not passing the buck to anyone.

I told you that it's unacceptable. Since this article, we have taken action. We're going to publish new guidelines. We're expanding beyond the people you see here because I want to capture other universities, so they become best in class. I don't think passing the buck is really what we're doing. We're addressing that.

To your specific question, I want to be responsive. I'm a parliamentarian just as you are.

Mr. Ben Lobb: I did ask and you said we should bring in some security people.

Hon. François-Philippe Champagne: You should have the security agency folks. I think they would be better suited to answer that question.

Ms. Valerie Bradford: I have a point of order.

Mr. Ben Lobb: That's fair enough, but the other question would go back to actually knowing which students are studying here, which universities and which research students. We don't have a list. We don't have any knowledge. None of the folks here around the table—it doesn't matter if it's government or public servants—apparently have the answer to that.

Ms. Valerie Bradford: I have a point of order.

Again, I question this line of questioning. It's inappropriate and off topic.

Getting back to the Avro Arrow, I was making a comment. It was not a question and it was to do with talent and moon shots. That's why I raised it.

The Vice-Chair (Mr. Corey Tochor): MP Bradford, we have 30 seconds left for Mr. Lobb to conclude his questions.

Mr. Ben Lobb: Here is a question for the minister: How much of your department is currently operating on the cloud? Do you have an idea? Is it all converted to the cloud? What are your goals as minister? Do you see the benefits of that?

Hon. François-Philippe Champagne: I would be happy to bring our chief technology officer to testify next time, sir. I would not start guessing how much is in the cloud, but I—

Mr. Ben Lobb: Does he report that to you, as the Minister of Industry in your own department?

Hon. François-Philippe Champagne: I'll just put it this way: I'm happy to provide a written answer to you, sir. I want to be accurate, with respect to your role as a parliamentarian. I want to be responsive.

If you allow us, we'll respond in writing to your question.

The Vice-Chair (Mr. Corey Tochor): Thank you kindly.

We are out of time, Mr. Lobb.

We'll go on to MP Collins for five minutes.

Mr. Chad Collins: Thanks, Mr. Chair.

Welcome, Minister.

I'll try to get us back on the moon shot questioning. That's why you're here.

Last week, you were in Hamilton, in my municipality, with the Prime Minister and cabinet. You had the opportunity to tour McMaster University's innovation park. Dr. Emadi was there, highlighting their work on autonomous vehicles as well as other AI-related work they're doing at McMaster.

One theme that came up during the tour—not just from the professor but from the students—was that there's a lot of private sector support. A lot of government resources have been invested in the facility—like, for that building you were walking through, obviously. Lots of federal, as well as provincial, dollars and investments have been made.

They were seeking more assistance along the lines of operational dollars. The automotive industries, in that instance, are providing funds for the students and the faculty to conduct the work they're conducting. Their question was this: What role does the federal government play on a go-forward basis from an operational perspective?

I know you're very familiar with the budget lines in your ministry. What role do you foresee us playing in the next couple of years, specifically with McMaster, but also with other institutions like it that are conducting very important research?

Hon. François-Philippe Champagne: Thank you for the question.

For the folks at McMaster, I like you. I love you, actually. You do great work. It's always a pleasure to go there. We were well received. Everyone was kind.

In a sense you're right. McMaster, like a number of centres, had a head start. I think that we have everything to win in the economy of the 21st century. When you talk about autonomous vehicles and when you talk about AI, we're certainly punching above our weight.

Historically, the Government of Canada has been more on the capex side. With the Canada Foundation for Innovation, that's where we've been. That's why we have these programs where we invested billions, actually, to help a number of institutions across the country really have the means of our ambitions to upgrade the labs, the facilities and all that.

I am very familiar that. When it comes to the opex side of things, universities have asked if we can help them there. We're going to be looking at that.

The other way we can look at that is through partnerships. You mentioned the automotive sector. I'm very grateful for the work of Professor Bouchard, who was part of this science review panel. One thing I'm trying to look at is what they do in the United States with partnerships with industry to try to bring more money to the table, so that it's not just taxpayers' money or government. Is there a way, like you see in the United States with some big corporations, where there are these tech parks where they can partner?

I think I see that in action. For electric vehicles, in my discussions with automakers, they're willing to be part of the solution. They understand that talent is going to be key to their success as much as our success, and they want to be part of that. That's a model.

I would say that the work of Professor Bouchard is going to be informative in trying to find the right balance between that. Obviously, if you finance opex, there's a bit less money for capex, so you need to have this kind of approach. I'm trying to look at—and I'm sure it's going to appeal to my colleagues on the other side, as well—how the private sector can play a role in that, so it's not just public funds. It's something we can do. I think it's in everyone's best interests.

● (1305)

Mr. Chad Collins: Thanks, Minister.

I know you had the opportunity to speak to President Farrar about the global nexus project they're working on, which is going to prepare us for the next pandemic.

Of course, McMaster was part of all the things related to the pandemic that we're dealing with today. It was part of a moon shot program 20 or 30 years ago that helped us with the vaccine and everything related to the R and D that went into helping our country and others across the world deal with the pandemic from a vaccine perspective. Its global nexus project is that next phase in helping us prepare for the next pandemic when it comes.

Where do you foresee your ministry going as it relates to key investments in pandemic preparedness and emergency preparedness, as it relates to moon shot programs in the area and R and D associated with the same?

Hon. François-Philippe Champagne: They did a very great job. They even showed me the plot where the building would be built. They brought me to the window and told me to just imagine the building that would serve the future of resiliency.

Listen—we are on the same page. Resiliency in the biomanufacturing sector is key. Like I said, the foremost responsibility we have as parliamentarians is the health and safety of Canadians. That's why, from the beginning, we invested $2 billion in the whole family of vaccines. At the time, we did not know precisely what would work.

Again, we're going to continue to invest. That project is very interesting.

There are also a number of projects in the west on health. We've been doing some work with VIDO-InterVac—

The Vice-Chair (Mr. Corey Tochor): I'm sorry, Minister. We're going to have to cut this off. We are running long—

Hon. François-Philippe Champagne: He would like me to continue to talk.

The Vice-Chair (Mr. Corey Tochor): I know.

We are very grateful to the analysts and the clerks, and most importantly, the interpreters, who stayed a little extra today to make sure we got in all of the rounds of questions. I appreciate the work that you do.

Our next meeting is scheduled for Tuesday, February 7, and Madam Chair will have the clerk publish the notice soon. Madam Chair needs to sign off on scheduling that. I am just the vice-chair.

With that, colleagues, is there agreement to adjourn the meeting.

Some hon. members: Agreed.

● (1310)

The Vice-Chair (Mr. Corey Tochor): The meeting is adjourned.