

Pere Puigdomènech

The end of science

One day, science will end. Probably, none of the human beings alive today on the surface of the Earth will see it, but it can be argued or even predicted that one day scientific activity will diminish until it disappears or turns into something else. Ten years ago, a book by an American journalist, John Hogan, proclaimed this with arguments that have been hotly debated, but, even if it is only to remember whether he was right or wrong, we may reconsider the question.

To begin with, we might think that one day we will know everything there is to know about any subject and there will be no need to investigate any further, something that has happened before in the history of science. For example, one of the questions that thinkers of all ages asked themselves was what things are made of, and the elemental substances that matter is made of were gradually discovered. In the 18th and 19th centuries, a start was made identifying the elements that matter is composed of. Mendeleev classified them and now we have them all. We may create a new one, but it is little more than a curiosity. It is a fact: the list of the elements of matter is complete. One day we set ourselves the task of having the complete sequence of the genome of a bacterium. Now we have dozens of them, and we have the genome of animals and plants and the human one. We have not finished them completely nor do we wholly

understand them, but we have got them almost complete. Soon we will have the structures of proteins classified. Some day we will know all the species of mammals on the Earth and the birds and reptiles, etc. Some disciplines are coming to an end. We are a long way from finishing the enormous programme of science, but some of the pages of the programme are full. We won't see it ourselves, but it is feasible to argue that one day we will complete the programme as a whole.

History teaches us, however, that this idea that there is nothing left to investigate has already been formulated in the past. By the end of the 19th century it had also been said that after two glorious centuries of discovery, science was finished. As Boltzmann said, the only job scientists still had to do was to achieve another decimal in the measurements that were being taken. Nowadays it is not that we need to have more precise measurements

of anything. The thing is that in our activity questions are constantly appearing to do with health, food, the environment and so on, and in order to try and answer them we need knowledge. Our economy is increasingly based on knowledge and it is difficult to see this demand ceasing. The knowledge generated from this type of demand may not be basic knowledge, but it is useful knowledge. And in any case, it often requires new ideas that only come from basic research. We may think of a society with zero or negative economic growth, but even in this case a lot of creativity will be needed in order not to lose quality of life in our society.

We may also decide not to research a subject any further because we do not wish to pay the price to know it. This is a more topical attitude and has more problematic aspects. The government of the United States decided not to continue constructing the particle accelerator that was planned in Texas. The knowledge of basic physics it would have provided did not outweigh the cost of the instrument. There are also people who think that no experiment is worth the suffering that animal experimentation involves. Or people who believe that we do not need to do any more research into agriculture because what we should be doing is traditional agriculture and all new knowledge will be, per se, dangerous. And there are those who do not want to research into embryonic stem cells. Therefore, for economic or ideological reasons, science (or part of it) may one day end.

Personatge amb A (Character with A), Artur Heras (2004)
mixed media on canvas, 260 x 130 cm
(private collection, Barcelona)



Because we must remember that even the knowledge used to resolve matters of immediate interest may be the subject of debate. It may be so, for example, for those who have specific interests that this knowledge threatens. Think of the effects that research into lung cancer has had on the tobacco cultivation industry. It may be also for those who see their ideological ideas threatened or because they see a threat to values on which their ideas of society are based. It is difficult for any society to balance the scales between the values championed by different groups. In this situation caution is often demanded or the very research is questioned that may generate data that cause the ideological or social balances of certain groups to be reconsidered. The conclusion may be that we do not want to know any more about a scientific discipline. At the present time there are movements promoting tighter political and social control over research priorities that in some cases propose



to eliminate certain scientific subjects. This might be a rather inglorious end for science, but much worse for the society that sustains it.

Many if us who work in science do so not for financial reasons (which would have been a mistake) but for the beauty of the work or because we have found who knows what in it, but also because we think that science is a factor essential for the workings of a democratic society. We are therefore worried (leaving aside the possible professional consequences) by these discussions about the end of science. It is worrying that decisions are made in our societies not based on the scientific analysis of the available data but on prejudices and subjective ideas. And it is worrying that some may feel that some of their values are being attacked by scientific discoveries. In this we scientists almost certainly ought to listen more to society and avoid conflicts. Because none of us can even begin to imagine what a world with nothing to explore would be like, with no interest in learning anything new. At least, if this happens, let it be because we have at our disposal the complexity of the knowledge of the world within reach, but not out of fear of knowledge that questions specific concepts or interests ||

Pere Puigdomènech is a biologist and a physicist and researcher in molecular biology. He is director of the Vegetal Molecular Genetics Laboratory, CSIC-IRTA (Barcelona).