

Opinion

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Two lifetimes: the age of the two most important ideas of science.

Half a century ago, as a student, I recall sensing that the science I was being taught had been known “forever”. Even if I knew the dates of Maxwell’s equations and of the discovery of the electron, they seemed to me then as from a very remote past. As I learned about them, the ideas seemed to me to be so well established as to be beyond surprise. Now, on the point of retirement, I have the opposite view. The ideas of science are incredibly new.

I have been prompted to these reflections by the publicity surrounding the Darwin anniversaries: the two hundredth anniversary of his birth and the one hundred and fiftieth anniversary of the publication of “On the Origin of Species”. Much of this discussion has focused on just how revolutionary the idea of evolution was. Now it seems to me that to be revolutionary is not an aim of science. It may happen that new ideas in science are revolutionary, but that is not what they are about.

Science organizes observations into structures. By establishing patterns that link disparate events, science enables us to think about a much larger set of things than we could otherwise handle. The importance of a scientific idea is not how revolutionary it is, but how broad is the sweep of experience that it encompasses. And how much these frameworks inform, not just our science, but our everyday thinking—our view of the world in which we live.

In this light it seems to me there are two ideas, above all others, which provide frameworks on which all the rest of science—and indeed all human thought—is built. Evolution, the idea developed by Darwin, is indeed one of these; the other is the periodic table proposed by Mendeleev. Darwin gave us a framework for thinking about all life forms. Mendeleev’s idea, that there are only a finite (and small) number of elements and that they have properties that vary in a predictable and well-defined way, underlies all of our thinking about the material world – including life forms.

There are other candidates for the title of the most important intellectual achievement of mankind: A case could be made for logic and mathematics; for language and writing; and (of course) for science itself, among others. I will not here try to defend my choice of evolution and the periodic table as the greatest achievements of mankind, that is not my purpose. Even if you disagree with me and believe that other intellectual achievements stand higher, you will surely accept that these two ideas are among the greatest. Both of these ideas totally govern the thinking of (almost) everyone now. They are taken for granted in everything from television news reports, to novels, and in all cultural interchange.

Darwin published “The Origin of Species” in 1859. Mendeleev wrote his account of the periodic table in 1869. Let us reflect on this. I am getting old: I am on the point of retirement. I was a student about 100 years after these two ideas were developed. At that time, 100 years seemed like an eternity to me. Now that I am older, I have a different view. My father (who is still alive) was born in 1911. This means that he must have met and spoken to people who were born—who were educated even—before the idea of evolution and the idea of the periodic table had been formulated.

These two major unifying ideas—ideas that govern the way we think about almost everything really—were new to man in the very recent past: just two lifetimes ago.

Surely the incredible advances in science and technology over these last one hundred and fifty years are in large part built on the foundation of these two extraordinarily powerful ideas. They have enabled us to think so powerfully about the world in which we live that progress has been stunning.

Two lifetimes. Such a short time and such a different world. This prompts a related thought. There are people who complain that science has no explanation for this or that. That science is in some sense deficient if it cannot give an account of every observation. Good grief, we have had only two lifetimes out of all the history of mankind in which to find answers. No wonder there is still so much we can not understand. The real science of our modern world, the ideas that have shaped our thinking and our world view began only two lifetimes ago: yesterday.

I am prompted to this final question: will there ever be (or, perhaps more realistically, is it likely that in our lifetimes there will be) another idea as powerful in framing our thoughts and our lives as the ideas of Darwin and Mendeleev? **MT**

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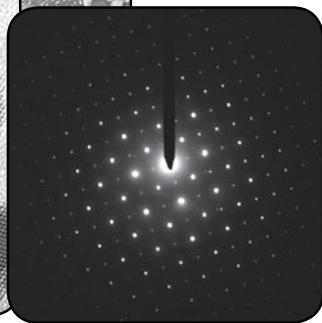
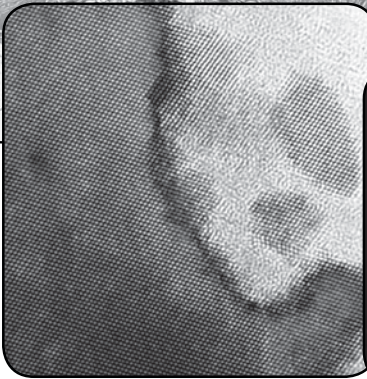
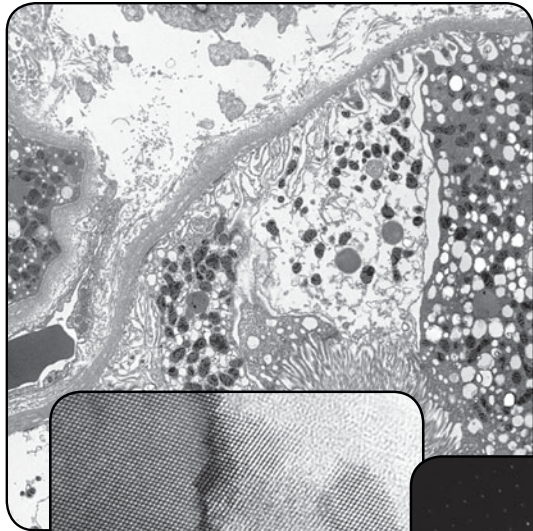
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