

Whenever they were promoted, universal scientific languages were meant to serve communication among scientists. A more exact language, to be easily mastered by everyone was supposed to smooth the exchange of knowledge. After all, scientific communication is all about the exchange of scientific knowledge, about developing and examining scientific thought on all levels. Scientific progress simply wouldn't exist without the exchange of scientific knowledge, without a constant dialogue among scientists aimed at developing existing theories, aimed, finally, at enlightening the way in which we perceive our world. The pragmatic barriers of communication between scientists are well known. I will quickly mention the three most notorious ones. I will then ask the question of whether some of these pragmatic barriers are founded in a more basic, intrinsic and universal limit of communication, which we usually don't talk about, but which however remains important for the pragmatic level of communication.

The first pragmatic barrier is the linguistic barrier. Even though English is well established as the global language of science, and even though everybody speaks English, some people don't. And even if they do, another kind of linguistic problem remains: The terminological problem, one of the gravest and most annoying side effects of modern science. The success of modern science is based on specialisation; so is the terminological problem. Every field of research tends to develop its own, rich vernacular, and understanding them all is quite impossible.

The second pragmatic barrier to scientific communication is the cultural barrier. Whenever conceptualisations determine processes of research, the cultural determination of concepts remains a factor not to be denied.

The third pragmatic barrier is a technological one: The exchange of scientific knowledge relies on means of conveying messages over large distances. In the course of globalisation this third barrier almost disappeared: Telecommunication and the internet provide easily obtainable and affordable means for everyone to communicate with everyone.

These three pragmatic barriers of communication in science - linguistic, cultural and technological - have two things in common: Firstly, they could theoretically be overcome. Certainly not in the near future, and it certainly wouldn't be easy. Secondly, they don't constitute the most fundamental barrier of communication among scientists. This most fundamental barrier is not of a pragmatic nature. In fact, it hardly ever gets or requires any special attention in scientific or other communication. Reminding of it may however be useful for pointing out why clearly not all of the three mentioned pragmatic barriers are undesirable in every respect.

Communication among scientists is a necessary condition for scientific knowledge. More broadly speaking: Communication and "language" in the sense of "speech" is a necessary condition for all knowledge. Knowledge is about making oneself understood. Imagine yourself walking through a forest where you find some strange object that you have never seen before. Probably, you will somehow start to examine it, because you will want to know what it is. What goes on in your mind when you examine an unknown object? You might ask yourself: "What does it look like? Could it be something like this? Or is it rather that?" This very

process of trying to find out something, of gaining knowledge about something is a process of making yourself understood to yourself. It's a kind of "coming to terms with something", an attempt of explaining something to yourself. This basic process of acquiring knowledge about things we encounter turns out to be an inner soliloquy of a dialogic structure: Making yourself understood to yourself is not that much different from making yourself understood to others.

Making yourself understood to others is of course central for any exchange of knowledge, hence also for the exchange of scientific knowledge. Making yourself understood to others aims at mutual understanding, at being understood and at understanding. If you can't understand where the person you are talking to is coming from, you are not going to make yourself understood, and vice versa. Intending mutual understanding implies a constant attempt at avoiding misunderstandings. This is obvious: If you are trying to tell something to somebody, then you must avoid that he or she understands whatever you don't mean. Essentially, making yourself understood and avoiding misunderstanding are two inseparable sides of the same process. If that is so, misunderstanding proves to be an integral part in the exchange of knowledge. By misunderstanding I mean a certain form of error, of which there are basically two kinds: There are (1) misjudgements of phenomena, which we for example may encounter and explore as scientists and there are (2) semantic misjudgements, for example of somebody else's propositions. Both needs to be avoided if communication in science or elsewhere is to result in an exchange of knowledge.

The fact that misunderstanding becomes an integral part of communication by our necessary attempt to avoid it is not as trivial as it may seem. If the exchange of scientific knowledge is essential for science and scientific progress and if misunderstanding (as characterised) is an integral part in all exchange of knowledge, then obviously misunderstanding turns out to be an integral part of scientific progress. No scientific knowledge can ever be final, because there is no knowledge to be gathered without the risk of misunderstanding, of simply getting it wrong. Misunderstanding is necessary for that process of making oneself understood which we call knowledge. That doesn't mean that we are constantly misled with our beliefs in having understood something; but it does mean that knowledge and the processes of acquiring it in scientific research and communication can never result in an eradication of error. If we can admit that, it may change our attitude to some of the mentioned pragmatic barriers of scientific communication. If we concede that the specific misunderstandings produced by these barriers are unavoidable and integral parts of scientific progress, we may be more willing to learn that they are in fact not only annoying, but also highly productive. In this light, linguistic uniformity might then be deemed a bigger threat to productive scientific communication than our current multilingualisms.