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Confusion of Tongues

Steven Shapin

Scientific Babel: The Language of Science from the Fall of Latin to the Rise of English by Michael Gordin
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From God’s point of view, the problem with the Tower of Babel was an excess both of hubris and of technological power. God had designed human beings to recognise the limits of what they could achieve, and here they were building a ‘tower whose top is in the heavens’. Not in my backyard, God thought, and pondered both the cause of man’s vaulting ambition and how He might put a permanent check on it. The trouble was that the people ‘all have one language, and this is what they begin to do; now nothing that they propose to do will be withheld from them.’ The solution God came up with was the ‘confusion of tongues’, ‘that they may not understand one another’s speech’. One tower-builder would now say, ‘Bitte geben Sie mir einen kleineren Schraubenschlüssel,’ and another would reply: ‘Non ho idea di quello che stai chiedendo.’ Exasperated, a third would suggest, ‘Давайте чашку чая и домой,’ and a fourth, turning his back on the whole business, would announce: ‘Kei te korero koe i tito noa, ko ahau ngenge o te whare pourewa.’ Living in a post-Babel world, many readers of the *LRB* will understand one or perhaps two of the speakers, but it’s unlikely that more than a handful will be able to work out what all of them are saying. And, to be truthful, this (barely monoglot) writer constructed the conversation courtesy of Google Translate.[*]

That was meant to put an end to the matter. It would still be possible for each language community to build a tower of its own, but without the capacity to pool all its resources, share its ideas and co-ordinate its activities, humankind wouldn’t be able to build a tower tall enough to reach the heavens. There are some sorts of thing that can be done alone; others that ‘take a village’; and others that involve co-ordination on a massive scale. Science is not the only thing that calls for global co-ordination – there are forms of religion, commerce, finance and military action that bear comparison – but Michael Gordin argues that Babel has long been a special problem for science and that science, in turn, has had a special role in coping with it and in trying to overcome it. Scientists wish to, and sometimes need to, communicate with their peers all over the world, and they want to do that

effectively and without ambiguity. It’s said that scientists are natural cosmopolitans – far more so than their colleagues in the humanities or social sciences. Some scientific projects call for the production and collection of data on a global scale. Scientists often come together in one place, to be trained and to train others, to talk informally and to collaborate. And scientific claims are, in principle, subject to evaluation, criticism and corroboration by anyone, anywhere, who possesses the pertinent knowledge and skills. Many forms of scientific knowledge aim to represent reality irrespective of the nationality, culture and language of those producing it: scientific facts and laws are supposed to be universal. *Die Gedanken sind frei*, but if you don’t understand the language, thoughts aren’t free: getting access to them is difficult and expensive.

Once upon a time, so we’re told, all scholars read, wrote and spoke Latin. It was an ideal learned language because in one sense everybody spoke it, and in another scarcely anyone did. Originally the native tongue of a small area around Rome called Latium, Latin enjoyed its scholarly Golden Age in the medieval period. By this time it had long been a ‘dead language’: it was the official language of the Western Church and the working language of scholarship, but nobody’s *Muttersprache*. Since it belonged to no nation or race, it was ‘neutral’, available to everybody, or everybody who mattered: Asians, Africans and the Amerindians that Europeans hadn’t yet encountered spoke languages medieval scholars didn’t know, and the European non-learned spoke ‘vulgar’ tongues which were beyond the learned pale. Latinity wasn’t just the way scholars communicated; it was the way they recognised one another as scholars.

Latin was a solution to Babel, but a ‘paradise lost’ of universal scholarly Latin was, as Gordin insists, more legend than historical reality. First, in antiquity, especially in the Eastern Mediterranean, Greek continued as a ‘vehicular’ (or ‘auxiliary’) language, that is, a language that people whose native tongues differed could use to communicate. Even the Roman elite felt it necessary to have a command of the master-language of science and philosophy. Second, the decline of the Roman Empire meant the eclipse in the West of both Latin and Greek. The Eastern Empire ran for centuries largely through the lingua franca of a Greek dialect confection known as Koine, and Arabic was the major European scientific language of the Middle Ages. When the Arabic versions of original Greek texts were translated, they were rendered into Latin, which remained current among clerics and Church-affiliated scholars. The history of ‘universal’ scientific Latin is not continuous with antiquity; it became a standard scholarly language, Gordin writes, ‘through its encounter with Arabic’ centuries after the Roman Empire had ended.

We live now in a scientific world as monoglot in English as medieval scholarship was in Latin. From 1880 to 2005, the fraction of the world’s scientific literature published in English increased from 35 per cent to more than 90 per cent. It’s not just that there are a lot of scientists in English-speaking countries or those in which English is an official second language: the vast majority of Chinese, Japanese and Russian scientists write in English.

Fewer and fewer international scientific conferences feel the need to provide simultaneous translation, since all the papers are given in English – and you don’t need much English to take in the PowerPoint slides anyway.

Yet the second decline of Latin, which began in the late 17th century, didn’t immediately issue in its replacement by scientific English. What followed instead was Babel 2.0, a troubling confusion of tongues, which many scientists learned to cope with but which persisted as an inconvenience well into the 20th century. The road from universal Latinity to universal English was full of twists, turns and bumps. In Shakespeare’s time, the English never thought it likely that their language would spread very far: the late 16th-century English lexicographer Richard Mulcaster observed that the ‘English tung ... is of small reatch; it stretcheth no further than this Island of ours, naie not there ouer all’ (Gaelic, Welsh and Cornish were current on the Celtic fringes). Objections to English – even among the English – were familiar and, in general, well founded: its orthography and pronunciation, for example, were odd and inconsistent, an obstacle to the illiterate and an annoyance to the learned. Early colonisation did not greatly change the situation: it’s estimated that at the end of the 17th century only eight million people worldwide spoke English, fewer than other European languages including French, Italian and even Latin. The Holy Roman Emperor Charles V picked out the roles to which different languages were best suited: Spanish to speak with God, French to speak with men, Italian with women and German to horses. A similar remark has been attributed to the Prussian Frederick the Great, who added that English was the language he used to speak with his accountant.

During the Enlightenment, French was by far the preferred learned language. In 1783 the Prussian Academy of Sciences in Berlin staged an essay contest based on the question ‘What has rendered the French language universal?’: the explanation was thought to be worth discussing but the fact of the matter was taken as self-evident. One of the winning essays pointed to the essential clarity of French sentence structure: ‘That which is not clear is not French; that which is not clear is still English’ – or some other mess of a language. Among the claimants to priority in the discovery of oxygen at the end of the 18th century were the Englishman Joseph Priestley, who read and understood the French chemistry literature, and the Frenchman Antoine Lavoisier, who knew no English. ‘As a native speaker of what was touted as the universal language,’ Gordin writes, ‘he saw no need to learn the awkward speech from across the Channel.’

But by the mid-19th century, scientific language wasn’t universally French: it was a triumvirate of French, German and English. If you wanted to be a scientist, to keep up with the work in your field and to have a reputation in your discipline, you had to be able to read all three languages, to understand and speak them well enough to function at international meetings, and to write in each with enough competence that your native-speaking editor could correct your grammar, polish your prose and recognise the facts that needed to be checked. The emergence of Russian as a scientific language in the 19th

century, especially in chemistry, was a new and serious problem: few foreign scientists could master Russian, but many Russians realised that they needed to understand other languages, especially German. By the turn of the 20th century, there was a new and hugely disruptive confusion of tongues. Important research was being done in countries – Italy, Sweden, Austria-Hungary, Spain, Japan, as well as Russia – some of whose scientists knew only their native languages, or preferred to publish in those languages. How could science be universal when so many of its facts, theories and techniques were locked away in impenetrable languages? By 1900, European scientists, Gordin says, ‘considered almost no problem more severe than this conundrum of too many languages flooding the fragile community of scientists’. The scholarly information problem of ‘too much to know’ – in Ann Blair’s phrase – now appeared as ‘too many languages to know it in’. The problem grew worse with the resurgent Central and Eastern European nationalism that followed the First World War and with the modernisation of Meiji Japan.

Language is not incidental to science: if universal transparency is contained within the idea of science, then Babel 3.0 could be perceived as a threat to its existence. Some of the best bits of Gordin’s learned, wise and often very funny book concern the attempts to solve scientific Babel, not by choosing among existing languages, or by using pidgin versions, but by making up an auxiliary language that everyone would learn and that would be specially suited to communicating scientific information. This would be the fulfilment of the 17th-century dream of a universal language in which the order of words would unambiguously reflect the order of things and the logical relations among things. Ideally, it would be a neutral language, owned as a native tongue by no nation or race. First up was Volapük (‘worldspeak’ in its own lexicon), devised in 1880 by a Catholic priest swept up by the contemporary enthusiasm for the development of international standards for all sorts of things – measurement, time, electricity, chemicals, railways and so on. Volapük was an attempt to rationalise grammar, prefixes, suffixes and spelling, building on the roots of existing European languages – English and German in particular. The intention was to replace all other languages, and Volapük was meant to be easy to learn just because it was scientific, unburdened of all the historical eccentricities, exceptions and ambiguities that had accreted in existing languages. It’s funny to read about it now, but at the end of the 19th century, it was no joke: Gordin estimates that more than 200,000 people, from China to America, studied Volapük. There were hundreds of publications in Volapük, well-attended international congresses about and conducted in Volapük, and confident predictions that it would, within a few generations, turn out to be the final solution to Babel. After all, much scientific nomenclature was already international, for example, the names for elements, plants and animals, cloud formations, celestial bodies, anatomical parts and medical conditions, metrical units of length, weight, volume and so on were derived from Latin and Greek.

Volapük imploded quite suddenly – a familiar story of difficult personalities, differing

visions and the contest for control of a revolutionary movement – but the dream of fixing Babel by constructing a universal language did not go away. Just as Volapük was self-destructing, a Polish-Jewish ophthalmologist was cooking up Esperanto, not as a replacement of all existing languages but as a universal auxiliary. By 1900, Gordin says, ‘the most serious minds of Europe’ had ‘learned it, analysed it, adopted it’. As with Volapük, its virtues were its use of roots from familiar source languages, its cultural and political neutrality, and its rationalised and simplified grammar. Once more, scientists were especially keen on it. But hopes were again dashed by battles over who was in charge. The key question was how to maintain the stability of the language while allowing for the organic development that permits natural languages to adapt to changing historical circumstances.

The constructed language movements didn’t succeed, but the ‘triumph of English’ was not the reason for their failure. In 1920, scientific literature in English was still running second to German. By 1960 English was used in just over 50 per cent of science texts. Then it really took off: between 1980 and 1996, English usage rose from about 75 per cent to 91 per cent; Russian dropped from 11 per cent to 2 per cent; and German from 2.5 per cent to 1.2 per cent. Gordin canvasses several explanations for this surge. The first story concerns the decline of German. After the First World War, a quite effective boycott of the German language lasted through the 1920s, and then German quickly became toxic again with the rise of National Socialism. The Nazis destroyed German science, and by the time German academic and industrial research had recovered in the *Wirtschaftswunder* of the 1960s and 1970s, the American and British education systems had long since begun to neglect language teaching. (Several years ago, Larry Summers, the former president of Harvard, announced that it was no longer worth the ‘substantial investment’ for students to learn foreign languages, since English had emerged as a ‘global language’ and, anyway, machine translation was getting much better.) Native English-speakers saw less and less reason to master even the hollowed-out form of the language known as ‘technical’ or ‘scientific’ German, while the Marshall Plan was dedicated, Gordin writes, to ‘building a “Western” science in Europe that was strongly allied with the United States and also predominantly Anglophone’. The physicist Isidor Rabi, a science adviser to Eisenhower, lobbied for the incorporation of West German science into collaborations with Nato projects.

So the triumph of scientific English is a small chapter in the history of the Cold War. The surge in English, Gordin shows, had much to do with the rise, and increased strategic significance, of Soviet science and technology. The launch of Sputnik in 1957 made the US more anxious than ever to find out what Soviet scientists and engineers were up to. The Americans, Gordin says, saw themselves ‘in the throes of a translation crisis, a necessary by-product of the scientific and technological competition that gripped the superpowers.’ Federal funds were supplied for the expansion of Russian-language teaching but, more to the point, the government desperately wanted translations of Soviet technical literature. You

might have thought that the rising importance of Soviet science, and the fact that Eastern Bloc scientists were obliged to learn Russian, would chip away at the hegemony of English, but in Gordin’s striking account it actually worked to solidify the Anglicisation of science. One private company, Consultants Bureau, Inc., which was founded after the war, turned translation into ‘assembly-line labour’, driving down per-word pay rates. By 1970, the bureau had found enough financially desperate translators and under-employed PhD scientists to enable it to churn out 34,000 pages per year of – often not very accurate – English from Russian. The American Institute of Physics also jumped into the business, supported by the government’s National Science Foundation (NSF). By the early 1960s, more than eighty Soviet technical journals were being translated, cover to cover, into English. ‘It was,’ Gordin says, ‘the largest scientific translation project in the history of the world.’

At the same time, American hopes were also hitched to projects to replace very low-paid human translators with very expensive machines, a paradigmatic Cold War exercise which joined up such research universities as MIT and Georgetown, the Rockefeller Foundation, IBM, the NSF, the Pentagon and the CIA, and which was driven partly by the knowledge that the Soviets were also investing in a crash-programme in computerised machine translation. But the power of machine translation had been oversold, and by the mid-1960s these projects essentially ground to a halt, to be revived again only in the late 1980s. Even so, the Russian translation programmes had created a new linguistic reality: Soviet science and technology were recognised as vitally important – for both military and academic reasons – and the world’s scientists now had access to an enormous amount of the Soviet literature in English. Brazilian and Egyptian and Greek scientists knew that they had to be familiar with both the English-language and the Russian literature. Once, they would have had to understand two languages to do this, but now the American translation juggernaut ‘had made it possible to get by entirely on English – not instead of learning about what the Soviets were doing, but *as a means* of learning what the Soviets were doing’.

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Does it matter that science is now conducted overwhelmingly in English? Here Gordin makes a distinction between ‘communication’ and ‘identity’. The communication of technical material through translation, and through universal English, is pretty efficient, though Gordin pays scant attention to the fact that ‘English’ sentences in, say, a biochemistry paper can be incomprehensible to a native Anglophone theoretical physicist but lucid to a Japanese biochemist. (Scientific English, he notes, is itself a dialect, but it would be better to describe it as a very large number of loosely connected dialects.) By ‘identity’, Gordin means something like the ability confidently to express meaning, feeling, nuance – something that’s very hard to do in a language you didn’t learn as a child and in which you don’t function every day. In a monolingual English world, identity and communication are the same thing for a native English-speaker but quite different for those

who have to learn the language at school and from textbooks. As a result, ‘birthright’ English-speakers have a big advantage: they give the impression ‘of being – more or less – at home everywhere’, while non-native English-speakers feel themselves tourists almost everywhere. This is the point at which the problem of scientific Babel can’t be disengaged from the problem of what science *is*.

If you conceive of science as an information system, as an accumulation of data and logical relations between data, then you will probably feel that the efficiencies of English monolingualism outweigh its disadvantages. But Gordin also (and too briefly) introduces a different conception of science, not much taken up by philosophers, which emphasises the importance of metaphorical extension in scientific change. Scientific notions like wave, force, law, heredity and fact have different semantics when expressed in different languages: as metaphors imported from everyday life, they have different resonances and affiliations in different cultures and languages, and therefore different bearings on the resources scientists have to extend their meanings through research and theory. (Science itself is such a notion: its semantics in English are not exactly the same as *les sciences*, *Wissenschaft*, наука or *επιστήμη*.) So, depending on whether you think of science solely as an information system or as encompassing the dynamic exploration of metaphors, you come to different conclusions about the significance of monolingualism. If metaphor is central to science, then the language in which science happens matters a lot.

In Gordin’s well-founded judgment, there’s no quality intrinsic to the English language that makes it suited to be a global scientific tongue: it’s not ‘easier’ than many other languages; it isn’t any more ‘rational’. Its success has got a lot to do with geopolitics; and, if English is more adaptable than, say, French, that’s partly an effect of its globalisation. The Anglophone world lacks an academy fixing proper usage; it’s often driven by the rebellious young, by counter-cultures and popular cultures, by geeks and advertisers. And, as it spreads across the world, changes in its vocabulary, grammar and pronunciation are in the hands of those many millions of users for whom English is a second language. It is a language out of control, and that gives it much of its diffusive power. The mobility of English owes a lot to its mutability.

Scientific Babel is about the emergence of monolingualism in a set of technical practices – practices whose increasing importance in late modernity is inescapable. But science is not the only domain in which English has vastly extended its reach. Gordin has little to say about this, and a case can be made that science hasn’t been a prime mover in the globalisation of English. Over the last half-century or so, much international business has been conducted exclusively in English, even by corporations whose headquarters are located in non-Anglophone countries. A recent issue of the *Harvard Business Review* reported on the many multinational companies that have mandated English as their official corporate language, including Airbus, Daimler-Chrysler, Renault, Nokia, Samsung, SAP and Microsoft in Beijing. Global popular culture has also become increasingly Anglophone. Of the winning

entries in the Eurovision Song Contest since 1956, 29 have been performed in English; French comes a distant second; the Belgians have twice performed songs in imaginary languages. Since 1999, just one winning song has not been in English, and this year only five out of the 27 finalists sang in languages other than English. Then there’s real pop music – and especially the Beatles, who in 1965 so effectively taught the French how to speak Scouse:

> Michelle, ma belle
>
> Sont les mots qui vont très bien ensemble
>
> Très bien ensemble.

[*] Google Translate ‘learns’, so that anyone putting in the same English phrases that I did will get slightly different translations.

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