syntheses by looking at the target molecule and working backwards towards simpler starting materials, chemists can impress their peers by pursuing strategies no one else noticed, by using original sequences of previously disparate reactions, or by developing new reactions that enable them to construct bonds in an unexpected way.

The work isn't over when the first synthesis of a complex molecule is reported — there is always plenty of room for improvement, and chemists are fired up by the desire to make things better. Second-generation syntheses are often very different from the original, and may have fewer steps or contain new and unexpected chemical reactions. This iterative process is not just an academic exercise: process chemists in pharmaceutical companies are often the unsung heroes of the synthetic world, as they devise incredibly effective syntheses to produce kilogram quantities of potential drugs. By doing so, they save millions of dollars for their companies, and can reduce the environmental impact of the synthesis by minimizing the amounts of waste produced or the quantities of solvents required.

In a similar vein, chemists enjoy finding improved catalysts. Catalysts exist for many reactions but are often expensive, toxic or impractical for anything other than simple molecules. By exploring the chemical mechanism of the catalyst, or perhaps by just plain luck, chemists can develop second- and third-generation catalysts that dramatically outperform the first-generation system. This can be invaluable both in the lab and for improving industrial processes.

A common misconception is that organic chemists now have a complete 'toolbox' of reactions that can be applied to any synthesis. But the toolbox is certainly not full; many desirable reactions remain elusive. This is especially true in the area known as 'asymmetric catalysis', which involves the creation of a chiral material from a non-chiral substrate — molecules can exist in left-hand and right-hand forms, and the development of catalysts that can selectively make one of the two forms is a major challenge in the field. To outsiders, this is a particularly obscure field of work, but the inherent challenges involved attract vast numbers of researchers. Furthermore, the products of these reactions have enormous potential utility, as small-molecule tools that can tease apart a complex biological system, or as lead compounds that can be developed into the next 'blockbuster' drug. Without asymmetric synthesis, some hugely successful drugs — such as AZT for HIV/AIDS, or lovastatin, which reduces cholesterol — would be extremely difficult to make.

Today, a novice organic chemist is like a child in a sweetshop. There are many 'hot' areas to work on: 'green' chemistry, which seeks ways to eliminate environmentally harmful chemicals from common processes; the burgeoning area of nanotechnology, constructing minuscule components for a future age of molecular devices; or maybe just pushing the boundaries of chemical space, by concentrating on a single element such as boron and seeing what chemistry can be developed. The modern world requires medicines, agrochemicals and advanced materials, and it is chemists who must provide these. Far from being esoteric, organic chemistry serves global needs. ■

Five years on

Immigration restrictions imposed after 11 September 2001 have eased, but improvements must continue.

The attack of 11 September 2001 changed many things, including the way science is done in America. Before the attack, the United States was a focal point for scientists from around the world who went there to study, conduct research and teach. But in its aftermath, a series of restrictive new immigration measures led to lengthy delays for foreign researchers, and many were turned away. In 2004, we warned that these policies were strangling scientific exchange and could have dire consequences for the nation's scientific leadership (see *Nature* **427,** 181; 2004).

As reported on page 6 of this issue, things have improved, although perhaps not as much as many researchers would have liked. The Department of State has boosted staffing levels at its embassies and consulates, and new computer systems are helping to prevent applications from becoming lost during interagency security reviews in Washington. Waiting times for those reviews are down from months to weeks: in Beijing, a student visa that might have taken six months can now be granted in just ten days.

The government has taken other positive steps, abandoning a plan to force foreign scientists to obtain licences to operate lab equipment (see *Nature* **441,** 679; 2006), and revising a rule that would have required foreign-born researchers on defence-funded projects to work in 'segregated areas'. These moves were in response to a vocal and concerted campaign by a coalition of scientific, university and industry organizations that warned policy-makers that such restrictions would not be in the nation's best interest.

Researchers entering the United States today still find it a hassle, but most feel that it is worth the trouble to come to US laboratories. New statistics are showing a resurgence of foreign students, and researchers are probably following, although numbers reflecting their movement are more difficult to obtain.

This could lead some to believe that the problem is largely solved. But more should be done to ensure free scientific exchange between the United States and other countries. Scientific groups in America should continue to press for better training of embassy staff, and for the hiring of more scientifically aware case-workers. They should work with the State Department and the Department of Homeland Security to try to bring some much-needed transparency to the visa process. It is unlikely that the security checks at the heart of many researchers' delays will become more open, but more could be done to communicate with those entering the United States about the status of their applications. Finally, scientific organizations should support immigration legislation that would make it easier for foreign scientists trained in US universities to remain after finishing their work.

All this should be done with an eye to keeping an open dialogue between scientists and the federal officials overseeing immigration. In the event of another attack on the United States, such lines of communication could help to ameliorate the immigration restrictions that would almost certainly follow. The United States is a linchpin of the global scientific enterprise, and it is in everybody's interest that it remain open for business. ■

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