

## Editorial

It used to be argued – a very long time ago – that university research should set out to be useless, useless in the sense of not expected to produce anything useful. The expectation that university research be useful leads inexorably from hopeful attempts to exploit the results that emerge from research to assurances provided even before the research is funded that the results will be useful. And yet, there is evidence enough that startlingly beneficial innovation can spring from research intended to produce something else altogether. Graphene, lasers, penicillin, viagra and many more were all unintended, products of the sort of research that is now actively discouraged. But serendipity is rarely entirely random; it is helped along by intellectual curiosity, which in turn is encouraged by research that can slip the shackles of utility to inspire and excite.

Our first paper, that by Eugenia Perez Vico, Hans Hellsmark and Merle Jacob, looks at some of the tools used to measure the impact of academic research. It finds that the output of academic research is diverse. Much depends on just who is doing the research, and attempts to measure the impact of their efforts should take account of this diversity. A major challenge for innovation studies is the development of tools for understanding and measuring the impact of academic research. This paper contributes to solving the problem by providing a typology that allows improved analysis of the roles researchers play in order to make academic knowledge useful. A key finding is that utility creation is context dependent and varies between individual researchers and research groups.

Bill Kingston continues a fine *Prometheus* tradition of publishing papers critical of the existing intellectual property rights (IPR) regime. Discussion of IPR is dominated by the most straight-laced of economists and lawyers, and *Prometheus* offers an outlet to those of a different academic persuasion, and to IPR rebels and radicals generally. Kingston, whose knowledge of the subject is truly encyclopaedic, tackles a key patent problem head on. Only in theory does the patent system provide an incentive to technological innovation. In practice, the major incentive of the modern patent system is the advantage it offers firms able to exploit patenting within their corporate strategy. For such firms, the advantage offered by the patent may lie less in encouraging their own innovation than in discouraging the innovation of competitors. Their interest in patents may have nothing at all to do with technology. Financiers have come to have more involvement in the patent system than engineers. Kingston suggests a range of measures, often based on practice in the United States, for reversing this trend.

Fabien Girard also writes about patents, specifically the patentability of native traits and genes. He observes an erosion in the boundary between what is patentable and what is not. Much more is now patentable, and actually patented, than was ever envisaged by even the system's strongest supporters only a couple of decades ago.

In the field examined by Girard – the cross breeding of plants employing the methods of molecular biology – new patents hardly even pretend to encourage innovation and to stimulate yet further invention. They are blocking patents, intended to prevent innovation. The pro-patent bias of the European Patent Office is examined, but the problem extends well beyond Europe and suggests a serious breach between governments and the public interest they should be serving.

The literature on high technology is vast and a good part of it must surely focus on innovation in high technology. But what about low technology? Radical and rapid innovation has long been associated with high technology. Low technology has been assumed to be hardly innovative at all. This view is changing, and not before time. Hartmut Hirsch-Kreinsen provides a review of the new and growing literature on innovativeness in low- and medium-technology firms in the manufacturing sector. The paper eschews the customary assumption that low expenditure on R&D equates with low innovation, an assumption that has stifled the study of innovation in small and medium firms for far too long. Instead, Hirsch-Kreinsen applies a knowledge-oriented taxonomy and looks at the innovation in low technology firms in terms of the concept of a ‘distributed knowledge base’. From this new perspective, it proves possible to re-interpret much past understanding of low technology innovation.

And then we have our book reviews. The book review is an art form *Prometheus* is determined to encourage, though book reviewers are in short supply. Standard performance measures do not reward academics who review books. They give precious little credit even to those who write books. One might even observe that reading itself escapes the direct attention of academic performance measures – with predictable consequences.

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