regenerative function of women made them intrinsically superior to men. Female superiority was less in evidence in Weimar Germany, as Melissa Kravetz demonstrates in her investigation of the role played by female doctors and marriage counsellors in discussions surrounding which social, ethnic and economic groups qualified for marriage and child-bearing.

The second section, which mainly focuses on women's involvement in education, opens with Clara Cullen's discussion of female participation in the scientific courses run by the Museum of Irish Industry. While Cullen shows that a significant number of women participated in these courses of lectures and even won prizes in examinations, Véronique Molinari reveals how women's attempts to embark on medical studies in London were constantly fraught with difficulty, despite a strong desire on the part of women patients to be attended by members of their own sex. Elizabeth Blackwell encountered similar difficulties as she struggled to improve the medical education of women, as Hélène Quanquin shows, although she was careful to disassociate herself from radical feminism and women's rights activism. In a piece arguably better located in the first section, Lindsay Blake Wilson explores how the private lives of female scientists – notably Marie Curie – have been held up to harsher scrutiny than those of their male counterparts, thus tarnishing the reputations of women whose legacies need urgent re-evaluation. Amy Bix's chapter returns us to issues concerning women, science and education, taking the example of women's treatment at Georgia Tech as a salutary reminder that American engineering remained a male-dominated field until well after the Second World War.

In a change of tack, the final section opens with a discussion by Caroline Bertonèche of the role played by female emancipation in Romantic literature, a theme neatly picked up in the following chapter by David Leishman, who offers a fascinating discussion of how sterility, fertility and fecundity are cast in the works of the contemporary Scottish author Alasdair Gray. Donna Spalding Andréolle shifts the focus back to American feminist science fiction of the 1970s and 1980s to explore how similar issues of reproduction are addressed in works spawning alien women, mutant human females and men who suckle babies. The final contribution by Yukihide Endo brings the collection up to the end of the twentieth century with its discussion of how the figure of the cyborg has allowed a new alternative perspective on female gender identity to develop.

One of the great strengths of this collection is that it does not seek to cast all the women it covers as 'trailblazers' and 'pioneers' who launched a radical, reactionary, attack upon the bastions of 'male' science. Rather, it offers a careful analysis of how women negotiated and navigated their way around a series of obstacles to achieve public recognition or access to education. While Spalding Andréolle and Molinari could have explored more thoroughly how women and the history of science interconnect (a nod to Patricia Fara's work would surely not have gone amiss) and an index would have facilitated orientation within the volume, this vibrantly diverse collection will be of interest not only to historians of women's studies and of science, but also to scholars of translation studies, literature and film.

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Peter Heering and Roland Wittje (eds.), **Learning by Doing: Experiments and Instruments in the History of Science Teaching**. Stuttgart: Franz Steiner Verlag, 2011. Pp. 362. ISBN 978-3-515-09842-7. €49.00 (paperback).
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Bringing together authors from Europe, the USA and Canada, this collection explores the development of science teaching since the eighteenth century. Its main agendas arise from two areas that its editors perceive as largely overlooked: the potential use of experiments in contemporary teaching and the study of education within the history of science. As they note, such ambitious aims cannot be fully met in a single volume, but it is a promising start.

The rich material available to historians is evident in the range of media discussed in the volume: instruments, apparatus and experiments; texts; the lesson and demonstration; teaching laboratories; teaching aids and models; museums and gardens; and specimens, living and dead. With an introduction and fourteen chapters, moreover, there are many approaches to consider, some of which take the volume beyond the notional confines of its subtitle.

Naturally, instruments and experiments are strong presences. Peter Heering's exemplary chapter sets the scene by considering the transformation of instruments from research tools into teaching aids, suggesting four potential processes: simplification, downscaling, stabilization and iconization. His chapter is complemented by Paolo Brenni's survey of physics-teaching instruments between about 1800 and 1930, which also touches on the relationship between the hardwares of research and of teaching. A number of other chapters concentrate on the development of collections of instruments for teaching, including Lissa Roberts on two large collections for the instruction of Dutch orphans, Mar Cuenca-Lorente and Josep Simon on the growth of physics and chemistry collections in nineteenth-century Spanish secondary education, and Michelle Hoffmann on concerted attempts to introduce practical teaching methods in Ontario in the 1880s.

Other material aids are considered as well. Willem Hackmann looks at the history of the magic-lantern slide, which became a specialized teaching aid in the nineteenth century, and which he sees as the 'precursor of PowerPoint presentations' (p. 113). Dawn Sanders, by contrast, looks at the death and life of the plant specimen in the early twentieth century to uncover the troubled history of botany teaching, in which even the educational possibilities of studying nature became a contested subject.

The other side of the story is experimentation. Richard Kremer offers an analysis of textbooks (because little else survives by way of evidence, he notes) to investigate the introduction of student laboratory exercises in American physics teaching in the 1880s. Roland Wittje looks to the development of lecture demonstrations in early twentieth-century Germany through the groundbreaking work of Robert Pohl, for whom the act of performance was central.

Other authors focus on texts. Peter Langman analyses experimental-philosophy works of the eighteenth century, notably *The Newtonian System of Philosophy* by 'Tom Telescope' and Francesco Algarotti's *Sir Isaac Newton's Philosophy Explain'd for the Use of the Ladies*, which described the experience of witnessing. He argues that these portrayals of instruments and their use were for audiences who would not normally have seen them and so were creations rather than re-creations. Pere Grapí challenges the view that textbooks presented only stable and agreed theories by looking at nineteenth-century French examples and their role in chemical controversy, in this case over Berthollet's chemical affinities. Constantine Skordoulis, Gianna Katsiampoura and Efthymios Nicolaidis consider the ways in which textbooks – as translations, adaptations and finally original works – became embroiled in moves towards Greek liberation as part of a story of initial reception from the European 'centre' and then a move away from it.

While most chapters concentrate on selected evidence, Steven Turner's on the use of inclined-plane apparatus between 1880 and 1920 exemplifies the combined consideration of the full range of sources. In tracing the transformation of students from observers to experimenters, he draws on textbooks, laboratory manuals, student notebooks, teaching instruments and instrument catalogues to challenge previous narratives of a revolutionary period in scientific pedgagogy. It is an excellent methodological example.

Rounding off the volume is a chapter added since the 2009 symposium, an afterword in which Hayo Siemsen reflects on the role of instruments in teaching science today. Siemsen is keen to distinguish the way students see instruments from the way scientists do. 'Instruments', he writes, 'convey no other scientific meaning than in the way they are used' (p. 355) and should intuitively connect with students' everyday lives. His argument therefore challenges the idea of simply using laboratory-designed instruments based on those used in research. He is also keen to distinguish the

demonstration of phenomena from performing experiments, activities that require quite different apparatus. Based on approaches currently being applied successfully in Finland, his contribution is an interesting counterpoint to what has gone before.

With such a range of authors and topics, there is much to be drawn from this group of essays, which opens up fertile ground for future work. This is one of the editors' aims, so they have certainly laid a solid foundation. They are also honest about some of the deficiencies, notably the volume's partial and episodic nature. Given the many links to be made between the chapters, however, I did feel that an index would have been a useful addition. I would also add that some of the chapters are predominantly descriptive and could go further in providing some analysis and thoughts about the bigger picture, but again this is something that can follow. I do not hesitate, however, to recommend this as a thought-provoking contribution to an important aspect of the history of science and as a potent demonstration of the range of sources historians could be exploiting.

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Mario Biagioli, Peter Jaszi and Martha Woodmansee (eds.), **Making and Unmaking Intellectual Property: Creative Production in Legal and Cultural Perspective**. Chicago and London: University of Chicago Press, 2011. Pp. vii + 466. ISBN 978-0-226-90709-3. £26.00 (paperback).
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This stimulating collection comes just at the right time to address both cultural and historiographical concerns among historians (among others) about how to engage with the topic of 'intellectual property'. So rapid and overwhelming has been this term's rise to prominence in daily life and scholarly treatises alike that it is easy to forget that it only acquired any general currency in recent decades. Hitherto it has indeed been hard to find any strictly historical work that placed this increasingly divisive interpretive framework into useful diachronic or critical contexts. Fortunately this volume covers, with politically aware adroitness, the contingent ways in which useful knowledge has been both sometimes appropriated for profit and at other times liberated for the intellectual commons under pressure of political or economic critique. From this survey we learn productively of the non-proprietarian representations by which practitioners of science and technology (among others) have treated their subject, in ways that point ahead to a very different future.

The editors of *Making and Unmaking Intellectual Property* assemble a rich array of twenty-three chapters that collectively challenge any (dis)ingenuous attempts to reify intellectual property (henceforth IP) as a primitive concept. Their subtitle of 'Creative Production in Legal and Cultural Perspective' is shared with its originating 2006 conference Con/texts of Invention, sponsored by the Society for Critical Exchange, directed by Woodmansee, to assemble an impressively multidisciplinary array of lawyers (including Jaszi), historians, anthropologists and literary scholars (including Woodmansee). To capture the range of perspectives from all such fields, the editorial division of the book into five sections gives readers an effective map through territory sometimes unfamiliar, but never uninteresting,

The first section, 'High and low: IP practices and materialities', focuses on changes in patent law and practice over the last two centuries. Mario Biagioli's opening piece explains how over the course of the nineteenth century – and for the particular national contexts of the USA and France – the legal status of patents was transformed from mitigated monopoly to that of an inventor's right. This is followed by Kara Swanson's parallel study of the changing key role of the patent examiner in the US system, and William Rankin's account of the evolving character of the notional 'Person Skilled in the Art' inscribed in US patent drawings. Looking beyond patents and the USA, the second section is evocatively titled 'Before and after the commons and traditional