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The Stuttgart Database of Scientific Illustrators 1450–1950: Making the Invisible Hands Visible*

Klaus Hentschel[†]

The main features of a new online database of scientific illustrators are portrayed. We list illustrators of scientific publications of all genres (especially atlases, articles, textbooks) who were active between 1450 and 1950, thus excluding illuminators of medieval manuscripts as well as illustrators still active. Currently (Sept. 26, 2012), we already have more than 3,461 entries, with particular emphasis on anatomy, dermatology, botany, zoology, mineralogy, astronomy, and general natural history. Access to the database with its 20 search fields is free and open to all interested users at www.uni-stuttgart.de/hi/gnt/dsi/.

Everybody knows the world-famous anatomist Andreas Vesalius (1514–1564) from Padua whose *De humani corporis fabrica* (1543) gave a boost to medical anatomy. But who produced those extraordinary plates illustrating this early-modern jewel in the art of early book production? Few specialists will be able to answer this question offhand. It was Jan Stephan van Calcar (ca. 1510–1546), that Dutch virtuoso who trained under Titian in Venice. In this case the answer is relatively easy to find, of course, because many secondary publications exist incorporating the biography and social milieu of Vesalius within the history of medicine and civilization. On the other hand, the number of studies specifically focused on that medical physician's rather unknown woodcutter is tiny,¹ especially when he is compared to his teacher and guide

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¹ This woodcutter and engraver (on the various names by which he is known, see footnote 9) is treated, e.g., in M. Kemp, A drawing for the Fabrica, *Medical History* 14 (1970): 377-88; and J. Hazard, Jan Stephan van Calcar, précieux collaborateur méconnu de Vésale, *Histoire des Sciences Medicales* 30(4) (1996): 471-80. Cf. furthermore with L. Choulant, *History and Bibliography of Anatomic Illustration*, (Chicago: University of Chicago Press, 1920: 169-98). Incidentally, Calcar even provided the initial funding for the first printing of Vesalius's major work at the renowned press of B. Vitale in Venice. See also H. Cushing, *A Bio-bibliography of Andreas Vesalius*, (London: Archon Books, 1962); C.D. O'Malley, *Andreas Vesalius of Brussels*, (Berkeley & Los Angeles: University of California Press, 1964); and J.B. de C.M. Saunders and C.D. O'Malley, *The Illustrations from the Work of Andreas Vesalius*, (New York: Dover, 1973).

in the fine arts. Titian (Tiziano Vecellio, ca. 1490–1546) has been the subject of libraries full of books published by the history of science’s neighbouring field, art history. Some readers may also be thinking of the countless reference works and compendia compiled particularly by art historians and which provide a rapid source of information for artists: the encyclopaedias by Thieme and Becker (1907–50) and Vollmer (1953–62) and the *Benezit Dictionary of Artists* (2006) are the three most commonly used among them.² Ever since Vasari published his collection of artist biographies (1550), a new breed emerged in art history specifically devoted to the task of gathering and compiling facts about painters, graphic artists, and sculptors. For some periods and regions (such as Renaissance Italy or Victorian England), other reference works exist, but these again are dominated by art and popular illustrators, rather than anatomical and scientific image artisans.³ The additional offshoot of photographers since 1850 has meanwhile also become quite well covered in analogous reference works.⁴

And yet for our particular question this new breed of sources does not help us much further. Why not? The reason is that these compendia mostly feature “artists” catering to the art market and claiming to produce true “art,” even though such claims by graphic artists in the print and photographic media were contentious for quite some time. Most illustrators of scientific works do not meet this criterion and thus many of them are not covered in reference works. They fell through the cracks. Historians of art did not consider them “genuine” artists, while historians of medicine, science, and technology deemed them mere aids or handymen for their biographical key subjects: the scientists.

The meagre state of knowledge about many of these commissioned draughtsmen, engravers, etchers, woodcutters, painters, colourists, lithographers, photographers, and other illustrators has long been known

² See *Allgemeines Lexikon der bildenden Künstler von der Antike bis zur Gegenwart*, ed. U. Thieme and F. Becker, (Leipzig: Seemann, 1907–1950, 37 vols.); and H. Vollmer, *Allgemeines Lexikon der bildenden Künstler des 20. Jahrhunderts 1953–62*, 6 vols. Their successor, the *Allgemeines Künstlerlexikon (AKL)*, ed. A. Beyer, B. Savoy, and W. Tegethoff, (Germany: De Gruyter, 1991–), is available online in many research libraries worldwide. The latest 14 volume edition of E. Benezit’s *Dictionary of Artists*, (Éditions Gründ, 2006), containing 170,000 entries, as well as Thieme-Becker’s with 250,000 entries, are also available on CD. Besides these there are: G.K. Nagler, *Neues allgemeines Künstler-Lexicon oder Nachrichten von dem Leben und den Werken der Maler, Bildhauer, Baumeister, Kupferstecher, Formschneider, Lithographen, Zeichner, Medailleure, Elfenbeinarbeiter, etc.*, (Munich, 1835–52, 22 vols.); and D. Bryan’s *Dictionary of Painters and Engravers*, (London: George Bell and Sons, 1st ed., 1819, 4th ed. 1903-04, 5 vols.), both with later expanded and revised editions, along with many other similar reference works for other periods and linguistic groups.

³ See R.K. Engen, *Dictionary of Victorian engravers, print publishers, and their works*, (Cambridge: Chadwyck-Healey, 1979) and R.K. Engen, *Dictionary of Victorian wood engravers*, (Cambridge: Chadwyck-Healey, 1985).

⁴ See, e.g., www.schaden.com/photolit/ as well as the Photographers’ Dictionary all-art.org/20oct_photo/20century_photo1.htm.

and has often been deplored. Yet little has been done to redress it. This we would now like to change by making a start at closing this gap in the literature. Modern media permit an entirely new, prosopographical approach—that is, surveying their education, careers and family ties, patronage, and clients—to allow us to gain a deeper understanding of this important group of individuals and, in so doing, develop a greater grasp of scientific practice. On the basis of many disparate sources and specialized inventories⁵ supplemented by research on the internet, I, in collaboration with a student employee Torsten Himmel, am currently gathering such information and entering it, with the assistance of Ann M. Hentschel, into a database written in mysql by the graduate student Christian Lehmann.

Two existing databases served as our technical models, each with its own particular strengths:

1. The online “Catalog of the Scientific Community in the 16th and 17th Centuries” compiled by Robert Westfall, professor at the Department of History and Philosophy of Science at Indiana University, and implemented by Albert van Helden and his students at Rice University. It features 631 persons from early-modern science in a total of 20 search fields—albeit no scientific illustrators are included! (For a survey and for the comprehensive search mask, see: galileo.rice.edu/lib/catalog.html and galileo.rice.edu/Catalog/New/search2.html)
2. The “database machine drawings” (dmd) created by Wolfgang Lefèvre and Marcus Popplow at the Max Planck Institute for History of Science, which specializes in machine illustrations from the period 1235–1650. Its precise classification permits searches for specific elements of a machine or particular drawing techniques (see the general introduction at dmd.mpiwg-berlin.mpg.de/home and the more specific search mask: dmd.mpiwg-berlin.mpg.de/expert_search/dmd/database/expertsearch).

Within our database, the overlap in content with these two existing databases is minimal because, in contrast to 2, we direct our focus on scientific works in print after ca.1480. We do not propose to release any scans on the internet, either, but only include links to sample images stored elsewhere. I would like to take this opportunity, though, to thank the authors of both for their stimulus by posting a freely accessible database. Dr. Popplow also made himself personally available to us in helpful discussions during his time here as substitute chair in 2010.

A “Database of Scientific Illustrators” (DSI) fits perfectly within the program of the Section for History of Science and Technology (GNT) at the University of

⁵ See our list of approximately 60 of these sources found to be particularly helpful under www.uni-stuttgart.de/hi/gnt/dsi/sources.php.

Stuttgart because a strong focus already exists here on the historical study of the role of “invisible hands” in the exact sciences, with some volumes already having been published by us on the topic.⁶ In 2011, work commenced on establishing a database in English. It has meanwhile become accessible online at www.uni-stuttgart.de/hi/gnt/dsi.

At the present time, 3,461 illustrators of publications in science, medicine, and technology have been entered. Our ultimate goal is to reach a total of 5 times higher. For that we must rely on the assistance of others (see below). The period set for inclusion in the database ranges between 1450 and ca. 1950. Thus we exclude medieval colourists and manuscript painters as well as illustrators still presently alive and active. Specialized reference works and databases already exist for the former, and up-to-date commercial manuals are available for the latter.⁷

The Stuttgart DSI intends to focus on the age of the printed book up to the emergence of new computer-based media and forms of representation. The basic idea behind our database is to support research on those making or commissioning scientific illustrations—whether they be the individual scientists or scholarly institutions, such as, academies or scientific societies—(by means of a search in the fields: *Worked for* or, resp., *Patronage*) without such contractors figuring in entries of their own. It is these contractors’ executors who stand centre-stage here, that is, graphic artists, model casters or sculptors, painters, and scientific photographers. Their biographical details have hitherto been neglected. About many of them, little more than a surname or monogram is known.⁸ A compilation of the numerous available sources creates a composite portrait with perhaps some of the pieces of the jigsaw puzzle still missing, yet at least the contours of a life and working relationships emerge. Reconstructing them as best as possible is the challenge that a practice-oriented history of medicine, science, and technology faces. The art historian Elke Schulze, who specializes in the culture of sketching and drawing, wrote a most impressive

⁶ See B. Ceranski, F. Hars, and G. Wiesenfeld, eds., *Auf den Schultern von Zwergen*, (Berlin, ERS-Verlag, 2005); K. Hentschel, ed., *Unsichtbare Hände. Zur Rolle von Laborassistenten, Mechanikern, Zeichnern u. a. Amanuenses in der physikalischen Forschungs- und Entwicklungsarbeit*, (Stuttgart: GNT-Verlag, 2008) and further secondary literature cited there, principally on the research trend in social science studies spearheaded in S. Shapin, The invisible technician, *American Scientist* 77 (November-December 1989): 554–63.

⁷ E.g., *Medical Illustration Source Book*, one of a dozen editions annually updated since 1987 by the American Association of Medical Illustrators, including sample work and addresses of illustrators now working in the area of medicine. www.elance.com/d/me/illustration/.

⁸ One illustration of the complex research involved in tracing such an unknown artisan is: A. Hentschel and K. Hentschel, An engraver in 19th-Century Paris: The career of Pierre Dulos, *French History* 15 (2001): 64–102. At the outset, we only knew his last name; for further details see: K. Hentschel, *Auf den Spuren eines Pariser Kupferstechers des 19. Jahrhunderts* (2005: 37–77), in the volume in honor of Andreas Kleinert.

study on this otherwise too rarely pursued question. Her monograph, published in 2004, examines the practice of art and drawing instruction at a number of German universities during the nineteenth century on the basis of university archival material; selected primary sources from various German university archives are presented there in an appendix.⁹

How can the user of DSI find and work with the information assembled in this database? A search mask on the user page permits free researching within the 20 searchfields. This number already approaches the technical upper limit normally reached by databases of this kind. In addition to listing the surnames (under *Last Name*) and first names (*Given Names*)—provided our research has been able to identify them—the DSI also specifies alternate spellings,¹⁰ extended names and titles (baron, etc.), monograms appearing on prints, pen names, etc. (under *alt. Names*); the years of birth and death; the location of the individual's death (*Place died*); the spouse (*Marriage*) and progeny (*Children*); professionally significant family members (*Relatives*); the father's profession (*Occupation Father*); important contracting scientists (*Worked for*); or patrons, including professional societies and academies (*Patronage*); collaborating fellow artisans or illustrators (*Collab*); and the most important region of his or her professional activity (*Region of Activity*). The mutability of the extension of geographical designations such as Prussia or the Kingdom of Württemberg over the course of history preclude their use in this database. A finite options list of modern country names is therefore supplied to allow meaningful statistical conclusions to be drawn. Other countries in which the person concerned had worked are accordingly entered at the beginning of the last field (*Other*). For instance, "Suriname" would be entered under *Region of Activity* in the case of Maria Sibylla Merian, because her famous studies on *Metamorphosis Insectorum Surinamensium* were done there, whereas Germany and the Netherlands would be listed under *Other*. Other essential supplementary remarks that are not included in the foregoing fields belong in this last field as well: for instance, other professions pursued by the illustrator, or secondary publications about his or her social circumstances. Directly pertinent primary sources and secondary literature are entered in separate fields (*Arch[ival] Source* resp. *Pub[lished] Source*) at the bottom of the search page www.uni-stuttgart.de/hi/gnt/dsi/dev/. Where available, an internet link address to representative samples of an illustrator's work is entered in the field *Samples*. In no case is any material scanned or electronically archived by us for public use. Thus we dispense with the tricky issue of copyright for large numbers of digital images. The user of

⁹ See E. Schulze, *Nulla dies sine linea* "Universitärer Zeichenunterricht: eine problemgeschichtliche Studie, (Stuttgart: Steiner, 2004).

¹⁰ For the case mentioned at the beginning, for instance: John Calckar, Calkar, Kalkar, Kalcker; Giovanni da Calcar; Johannes Stephanus Calcarensis, etc., all referring to the same person.

our database is just a few mouse clicks away from finding, at a single location, reliable, condensed information and numerous sources plus links to a few online samples, if available, for further consultation.

The main techniques employed by the illustrator are entered in a designated field of the database (*Techniques*). Besides basic methods, such as drawing, painting, engraving, or etching, various finer distinctions are made (e.g. copperplate engraving, hand-colouring, or lithography). A combined search within this category with truncated word roots is recommended.¹¹ If, for example, you are only interested in illustrators employing lithography, a search under this rubric for “lith*” will yield a list of such specialists in all its variants containing that sequence (currently 552). If, at the same time, “Germany” is entered in the search field under *Region of Activity*, a list of all illustrators who had worked lithographically inside Germany (excluding Austria and Switzerland) is generated (currently 107). Mould casters and wax-model makers are also included (currently 66). This is legitimate especially when you consider that the boundaries between two-dimensional and three-dimensional scientific illustrations are particularly blurred in the fields of anatomy and dermatology.¹² Nevertheless, two-dimensional forms of visual representation will definitely remain the focus of this database.

Because searches can be made in any field and they are even sortable for each of these fields, some interesting statistical questions can be investigated. I present here a selection to demonstrate the strengths of this research tool:

- How many women are among the database entries? For this we conduct a search for the degree sign in the second field. This symbol °, available on all international keyboards, has been entered in the *Given Names* field as an inconspicuous marker for female illustrators. This search currently gets 333 hits (among a total of 3,461 entries), which corresponds to a rate of 9.6 percent. The estimated number of ambiguous cases, where only the surname or beginning initials are available, must be factored into this result. Consequently the proportion of women among scientific illustrators is probably at least 10 percent.
- How many illustrators were predominantly professionally active within the region of present-day France? Currently 727, which is 21 percent.¹³ In

¹¹ On describing and distinguishing between the many varieties of printing techniques see, e.g., B. Gascoigne *How to Identify Prints. A Complete Guide to Manual and Mechanical Processes from Wood-Cut to Ink-Jet*, (New York: Thames & Hudson, 1986).

¹² See the excellent surveys in A. Riva et al., The evolution of anatomical illustration and wax modelling in Italy from the 16th to early 19th centuries, *Journal of Anatomy* 216(2) (2010): 209-22; and T. Schnalke, *Diseases in Wax: The History of Medical Moulage*, (London: Quintessence, 1995).

¹³ This value is only meaningful within limits, however, as we currently still have a strong bias in

view of the great practical importance of the graphic arts in the printing trade in France since the Colbert period, this is surely not an unwarranted exaggeration of the true proportion in this sector.

- How many illustrators worked on Count Buffon's dozens of opulently illustrated volumes, *Histoire Naturelle*? Currently we have 41: among others, Michel Aubert (1700–1757), A. J. de Fehrt (1723–1774), and Mariane Rousselet (1732–1826) widow of Tardieu—thanks to the thorough entries on his extensive *Oeuvres* by the *Bibliothèque Nationale de Paris* and the *National Library of Australia*, which offer particularly convenient search options in their websites. Searches are possible not only by book author but also by the name of the responsible graphic artist appearing in the right-hand lower corner of their plates.¹⁴
- Which illustrators were at least partly trained in London? Currently at least 41, bearing in mind that as yet, unfortunately, only a small fraction of the entries contain complete information about such education and training.
- Which scientific illustrators enjoyed the patronage of the English King or Queen? Currently at least 15; the French, Danish, Dutch, Spanish, Bavarian, Saxonian, Russian, and Sardinian courts are also represented. These figures are very low, of course, compared to professionals in the fine arts, for whom such relationships have been well studied for a long time already. Consider, though, that the corresponding data for scientific illustration still remain to be found (and entered). Individual or institutional patrons such as academies and scientific societies can also be searched for under *Patronage*.

As Buffon's example already shows, many entries in the database are interconnected in some way or another. There are whole networks of illustrators clustered around important publishing houses or around contractors such as Buffon, some of whom collaborated together if they did not succeed each other. Many illustrators were interrelated by family. A number of the database fields are designed to cast light on such family ties: spouses, the father's profession (specific skills in copperplate engraving, for instance, were frequently passed on to the next generation), as well as the number and professions of children and siblings, for instance. The Bauer brothers are one such productive family. Joseph

favor of Central Europe and English-speaking nations. External contributions will hopefully eventually help rectify this.

¹⁴ See, e.g., www.bnf.fr/fr/acc/x.accueil.html and trove.nla.gov.au/picture/result?q, respectively. On Buffon's illustrators cf. T. Hoquet, *Buffon illustré: Les gravures de l'Histoire naturelle (1749-1767)*, (Paris: Muséum d'Histoire Naturelle, 2007).

Anton Bauer (1756–1831), Franz Andreas Bauer (1758–1840), and Ferdinand Lucas Bauer (1760–1826) were all sons of the court painter Lukas Bauer (died 1761), who worked for the Prince of Liechtenstein. These brothers became quite famous for their masterful botanical illustrations in the *Codex Liechtenstein*¹⁵ and Franz Andreas later stood out in particular for his work at *Kew Gardens* as well as on the *Flora Graeca*. Other family dynasties of illustrators already included in our database are hardly known, however, such as the Basires or Klaubers.¹⁶ A conspicuous number of the women already in the database were married to illustrators or came from family backgrounds within the profession.

The database entries to date are based, on one hand, on historical research by myself and my collaborators on the life and work of scientific illustrators in such research areas as spectroscopy, astronomy and physics, mineralogy, chemistry, and materials research.¹⁷ On the other hand, we are currently systematically going through survey works on the history of scientific illustrations in other areas of medicine, science, and technology for specific mentions and signed plates for incorporation into the database. We have already checked for names in some standard works, such as, Blum on zoological book illustration, Chansigaud on ornithology, Choulant and Thornton on anatomy, etc.¹⁸ as well as pertinent articles, such as by Nickelsen on the draughtsmen and engravers for the Berlin Academy of Science during the 18th and 19th centuries.¹⁹ As regards the comprehensive and copious bibliographic analyses by Claus Nissen on illustrations in botany, zoology, and general natural history, we are still at the

¹⁵ See W.H. Lack in *Annalen des Naturhistorischen Museums Wien* (99B [1997] resp. 104B [2003]); W.H. Lack *The Flora Graeca Story. Sibthorp, Bauer and Hawkins in the Levant*, (Oxford: Oxford University Press, 1998); W.H. Lack, *Ein Garten für die Ewigkeit: Der Codex Liechtenstein*, (Bern: Benteli, 2000); furthermore the short entries in C. Nissen, *Die botanische Buchillustration, ihre Geschichte und Bibliographie*, (Stuttgart: Hiersemann, 1950, with additions in 1966); and C. Nissen, *Zoologische Buchillustration*, (Stuttgart: Hiersemann Verlag 1969/78); and in W.H. Lack, *Ein Garten Eden, Meisterwerke der botanischen Buchillustration*, (Köln: Taschen, 2008).

¹⁶ On Basire, see Wedmore in *The Dictionary of National Biography* (1885); W.S. Doxey in *Bulletin of the New York Public Library* (72) (1968): 252-60; and the literature cited there.

¹⁷ See, e.g., K. Hentschel, *Mapping the Spectrum*, (Oxford: Oxford University Press, 2002).

¹⁸ See A.S. Blum, *Picturing Nature. American Nineteenth-Century Zoological Illustration*, (Princeton, NJ: Princeton University Press, 1993); V. Chansigaud, *History of Ornithology*, (Amsterdam: North Holland Publishers, 2009, orig. French 2007); L. Choulant, *History and Bibliography of Anatomic Illustration*, (Chicago: University of Chicago Press, 1920, orig. German 1852 with later updates by trans. M. Frank and others); J.L. Thornton and C. Reeves, *Medical Book Illustration: A Short History*, (Cambridge: Oleander Press, 1983); H. Ludwig, *Nürnberger Naturgeschichtliche Malerei im 17. und 18. Jahrhundert*, (Marburg: Basilisken-Press, 1998).

¹⁹ See K. Nickelsen, Zeichner und Stecher der Berliner Akademie der Wissenschaften, 1700–1806, *Berichte zur Wissenschaftsgeschichte* 29 (2006): 293-308; and K. Nickelsen, *Botanists, Draughtsmen and Nature: The Construction of Eighteenth-Century Botanical Illustrations*, (Berlin: Springer, 2006).

beginnings of the data entry process.

The temporal distribution of the 3,461 scientific illustrators entered to date is:

Recorded year of birth	Number of persons
1400 – 1499	20
1500 – 1599	144
1600 – 1699	224
1700 – 1799	1002
1800 – 1899	948
after 1900	81

No birth year could be established for the remainder (ca. 20 percent). A similar number of individuals lack a year of death, but this statistic is generally somewhat lower; information on the death of these individuals tends to appear more frequently in the sources than birth dates. So far, 397 illustrators were recorded as deceased after 1900. As more entries are added, the temporal and regional distribution is expected to balance out more. However, the dominance of eighteenth and nineteenth century illustrators will prevail. Although the total number of professionals continued to increase during the 20th century, our cut-off limit at 1950 relegates many, by year of birth, to the preceding century.

The data entry is still underway. We are aiming at roughly 10,000 entries. Each of these entries should serve as a quick reference and condensed signpost to further biographical and specific sources—more is not envisioned. We do hope for contributions by interested users worldwide to fill in gaps and to expand the scope of this database beyond Europe and North America. This is the reason why this database was originally conceived in English and why we are now beginning to advertise this project internationally.

If any readers of this article are interested in participating on a volunteer basis in the data entry of applicable illustrators into the DSI, please contact us by email at: ihisegnt@hi.uni-stuttgart.de. Notification about individual entries are also possible (please write to the same email address). Please use the search mask as your grid and limit your information to brief key words. In all cases, first please verify in the *Lastname* and *alt. Names* fields whether the individual has already been included in the database. Additional suggestions should fill obvious gaps or other indispensable additional information. Sample illustrations must be limited to one or two links per illustrator located at a stable, reliable, and—preferably—short url. We would be particularly grateful for information about important scientific illustrators from linguistic regions beyond Central Europe, North America, and Australia. Please note that we generally include neither professional scientists (botanists, zoologists, mineralogists, etc.), nor publishers and printers of scientific texts. We are looking for their illustration artisans: their able draughtsmen, engravers, watercolour artists, sculptors,

photographers, etc. Scientists, physicians, and technicians are only considered for entry if they personally contributed significantly toward the production of plates in individual publications and did not simply supervise their printing—for the latter was, of course, nearly always the case.

We are convinced that a closer investigation of these illustrators will add an essential, profound dimension to the visual cultures of science and technology because the frequent and close cooperation between makers of images and their developers, users and interpreters is an often underrated component of scientific practice.²⁰

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²⁰ For model studies on such cooperative relationships see, e.g., K. Nickelsen, Zeichner und Stecher der Berliner Akademie der Wissenschaften, 1700–1806, *Berichte zur Wissenschaftsgeschichte* 29 (2006): 293–308; K. Nickelsen, *Botanists, Draughtsmen and Nature: The Construction of Eighteenth-Century Botanical Illustrations*, (Berlin: Springer, 2006); R.E. Dickerson, Irving Geis, molecular artist, 1908–1997, *Protein Science* 6(11) (1997): 2483–84; R. Richardson, *The making of Mr Gray's anatomy*, (Oxford: Oxford University Press, 2008); C. Lok, From monsters to molecules, *Nature* 477 (2011): 359–61; and R.D. Johnson, The combined eye of surgeon and artist, *Journal of Clinical Neuroscience* 19 (2012): 34–38.