Karl-Eugen Kurrer

# John Wiley & Sons, Wiley-VCH and Ernst & Sohn – a successful civil and structural engineering literature family saga

200 years ago *Charles Wiley* (1782–1826) opened a print shop in Manhattan, from which publishers John Wiley & Sons, New York, emerged in several historic development stages. During the 19th century *John Wiley* (Fig. 1) shaped the fortunes of the publishing house. In 1865 his son *Charles Wiley* entered the business, followed 10 years later by *William Halsted Wiley* (1842–1925). Since then the company has been trading under the name of John Wiley & Sons. Today the listed family enterprise, based in Hoboken (New York), is amongst the top group of international science publishing houses.

Ernst & Sohn, established in 1851 as „Verlag für Architektur und technische Wissenschaften“ (publishers for architecture and technical sciences) in Berlin, and renowned for the journals „Bautechnik“, „Stahlbau“, „Beton- und Stahlbetonbau“, „Bauphysik“, „DIBt-Mitteilungen“ and „Mauerwerk“ and a range of books, among them the „Beton-Kalender“ (concrete handbook) ‘flagship’ publication (established in 1906), has been part of the John Wiley & Sons publishing group since 1996: Referring back to the ‘family image’, we now know the „grandchild“ and the „grandmother“. The „mother“ of Ernst & Sohn is WILEY-VCH, based in Weinheim/Bergstraße, whose origins date back to Verlag Chemie (VCH), founded by the chemical industry in 1921. WILEY-VCH, Berlin, is the Berlin-based „sister“ of Ernst & Sohn, who specialises in physics, and whose origins date back to Akademie-Verlag, the leading science publishing house of the former GDR. The British „aunt“ is based in Chichester, trades under the name of Wiley & Sons, Ltd., Chichester, and specialises in engineering sciences publications.

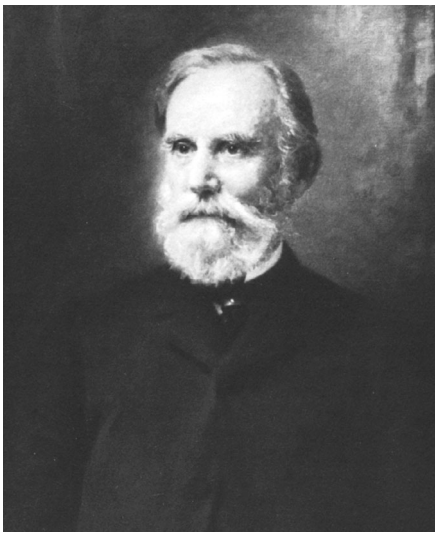


*Fig. 1. The publishing patriarch John Wiley (1808–1891)*

In families grandchildren and grandparents often get on very well, not just because of the presents, but mainly because of the stories grandparents tell their grandchildren. On the occasion of Wiley's 200th birthday we'll reverse the situation and give a brief outline of the story from the perspective of the grandchild.

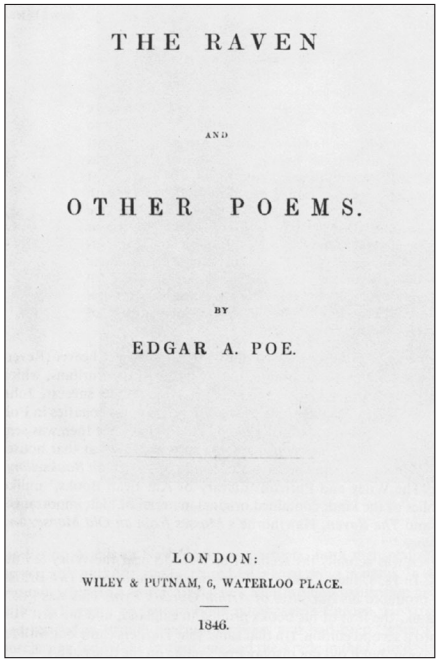
## Wiley & Putnam: A publishing duo writes literary history

As early as 1821 *Charles Wiley* had his first publishing success with the book „The Spy“ by *James Fenimore Cooper* (1789–1851). In 1826 *Johann Wolfgang von Goethe* (1749–1832) read the original version of *Cooper*'s „The Pioneers“ (to German readers better known as „Lederstrumpf“), followed by all his other available novels. The wise man from Weimar was convinced by *Cooper*'s literary talent, although the author of „The Pioneers“ only made it into literary history as a classic of literature for the young, despite the fact that he is the progenitor of the historic novel in US literature. The rise of the publishing house accelerated from 1836, when *John Wiley* was joined by *George Palmer Putnam* (1814–1872) as junior partner. One year later *Dennis Hart Mahan* (1802–1871), professor at West Point Military Academy, published his „Elementary Treatise on Civil Engineering“, which was Wiley's first civil engineering publication, although engineering literature remained an exception at Wiley & Putnam for the time being. The partnership between *John Wiley* and *George Palmer Putnam*, which lasted until 1848, enriched early US literary history enormously. In addition to *Cooper* authors included *Washington Irving* (1783–1859), *Nathaniel Hawthorne* (1804–1864), *Edgar Allan Poe* (1809–1849), *Richard Henry Dana* (1815–1882), and *Hermann Melville* (1819–1891). *Poe*'s collection „The Raven and Other Poems“ (Fig. 2), published by Wiley & Putnam in 1846, is regarded as America's first world class volume of poetry. It was translated into French by *Charles Baudelaire* (1821–1867), *Poe*'s kindred spirit and pioneer of modern European literature.

In addition to famous early US writers, Wiley & Putnam also published works from European writers such as *Victor Hugo* (1802–1885), *Hans Christian Andersen* (1805–1875), *Elizabeth Barrett Browning* (1806–1861) and *Charles Dickens* (1812–1870).

## The meteoric rise of the structural engineer

In 1849 *John Wiley* landed a major publishing hit: The monograph „The



THE RAVEN

AND

OTHER POEMS.

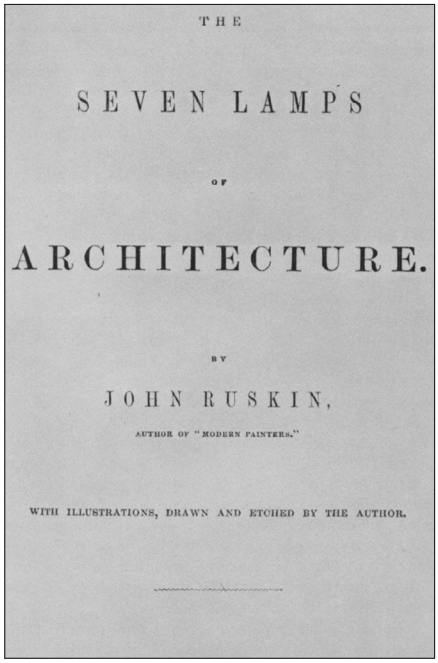
BY

EDGAR A. POE.

LONDON:
WILEY & PUTNAM, 6, WATERLOO PLACE.

1846.

*Fig. 2. Title page of the collection „The Raven and Other Poems" by Edgar Allan Poe*



THE

SEVEN LAMPS

OF

ARCHITECTURE.

BY

JOHN RUSKIN,

AUTHOR OF "MODERN PAINTERS."

WITH ILLUSTRATIONS, DRAWN AND ETCHED BY THE AUTHOR.

*Fig. 3. Title page of John Ruskins „The Seven Lamps of Architecture"*

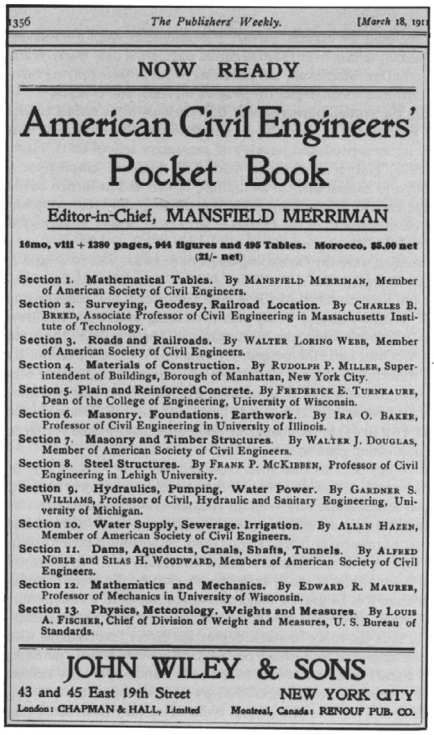


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*Fig. 4. Wiley advertisement in „The Publisher's Weekly"*

Seven Lamps of Architecture" (Fig. 3) by the British social reformer and art & architecture historian *John Ruskin* (1819–1900) – published by Wiley – set standards for architectural theory. By the end of the 19th century Wiley had published several other books by *Ruskin*.

In Germany the publishing house Wilhelm Ernst & Korn (today Ernst & Sohn), established in 1851 in Berlin, significantly influenced the architectural discourse with publications from the *Schinkel* school. Whilst the activities of the *Schinkel* school remained limited to the sphere of public construction, *Ruskin* developed ideas for counterbalancing the excesses of capitalism through a new way of life, which became a reality in the form of the British Garden City movement established by *Ebenezer Howard* (1850–1928) around 1900 and was creatively replicated in Germany by architects such as *Hermann Muthesius* (1861–1927), *Richard Riemerschmid* (1868–1957), and *Peter Behrens* (1868–1940). The co-founder of the „German Werkbund", *Hermann Muthesius*, spent some time working for the „Zentralblatt der Bauverwaltung" (construction management journal), published by Wilhelm Ernst & Sohn, and between 1898 and 1901 published several of his own works with Ernst & Sohn. While civil engineering displaced architecture among Wilhelm Ernst & Sohn's publications during the last third of the 19th century, John Wiley & Sons concentrated on engineering literature, reflecting the spectacular industrial rise of the USA after the American civil war (1861–1865). This development period of Wiley was shaped, both in terms of content and business aspects, by *William Halsted Wiley* a civil war veteran on the Union side and civil engineering graduate from the renowned Rensselaer Polytechnic Institute. Before *William Halsted Wiley*'s aegis, *John C. Trautwine* (1810–1883) had published his legendary „Civil Engineer's Pocketbook" with Wiley in 1872, of which no less than 17 editions were published by 1894. „The major" – a name often used for *William Halsted Wiley* – replaced *Trautwine*'s pocketbook with *Mansfield Merriman*'s (1848–1925) „The American Civil Engineer's Pocket-Book", published in 1911 (Fig. 4). *Merriman* taught civil engineering at Lehigh University between 1878 and 1888 and published important monographs with Wiley, among them „Theory of Continuous Bridges" (1876), „The Mechanics of Materials" (1885) and in 1888 jointly with *Henry S. Jacoby* the handbook „A Text Book on Roofs and Bridges", which was reprinted several times within a short period.

The Austrian civil engineering professor *Josef Melan* (1853–1941) and *David B. Steinman* (Fig. 5) published important bridge engineering works with Wiley. In his book „Plain and Reinforced Concrete Arches" (1915) *Melan* provides an overview of the design he invented, which consists of steel arch ribs frictionally connected with concrete to form a concrete arch with rigid reinforcement. According to an estimate by *Henry Spangenberg* (1879–1936), more than 5,000 *Melan* bridges had been built in the USA by 1924. Wilhelm Ernst &

*Fig. 5. Bridge engineer and Wiley author David B. Steinman (1886–1960)*

 

Sohn published several brochures describing *Melan*'s bridge system. In 1913 *Melan*'s original book entitled „Theorie der eisernen Bogenbrücken und der Hängebrücken" was translated by *Steinman* and published as „Theory of Arches and Suspension Bridges". *Steinman* later published it – with Wiley – in significantly expanded form under his own name as a monograph entitled „Suspension Bridges, Their Design, Construction and Erection" (1922). The second edition was published in 1929 under the title „A Practical Treatise on Suspension Bridges" and became the 'bible' of suspension bridge construction during the first half of the 20th century. *Steinman* oversaw the construction of more than 400 bridges on five continents. Together with the Swiss bridge engineer *Othmar Ammann* (1879–1965), who became a US citizen in 1924, *Steinman* personifies the emancipation of American bridge engineering from European influences – in fact during the 1920s they both set standards for the construction of long-span bridges.

*Fig. 6. The Empire State Building at night, photographed in 1930 by Lewis Hine*

## Algorithmisation – rationalisation – scientification

Since the beginning of the 20th century American structural engineers also set standards (in a double sense) for the construction of tall buildings: On the 1st of May 1931 the American president *Herbert Hoover* (1874–1964) officially opened the 381 m high Empire State Building (Fig. 6). During a construction time of only 19 months 2,500 workers processed 60,000 t of steel and 10 million bricks. A critical report entitled „Bauliche Fragen bei der Weiterentwicklung der amerikanischen Wolkenkratzer" (structural issues concerning the further development of American skyscrapers) was published in the October 1931 issue of „Der Stahlbau". The author criticised the common calculation methods for high-rise buildings, stating that in „reality (…) the distribution depends on the moment of inertia ratio in the beams and uprights, as clearly indicated by any framework formula for simple cases".

In 1930 the American structural engineer *Hardy Cross* (1885–1959) published the iteration technique named after him in „Proceedings of the American Society of Civil Engineers". The technique enables fixed-end moments of statically undetermined multistorey frames to be determined easily, quickly and efficiently. Two years later *Cross* and *Newlin D. Morgan* published the book „Continuous Frames of Reinforced Concrete" at Wiley, in which the technique is applied to statically indeterminate continuous reinforced concrete beams. *Cross*' ingenious method not only replaced calculation methods for high-rise buildings that had been widely used until 1930, such as the cantilever technique or the portal technique, it spread across the entire sphere of structural theory and was soon also used in ship and aircraft construction. In parallel with the algorithmisation and rationalisation of structural calculations the main engineering disciplines started orientating themselves towards their common scientific basis in the form of applied mathematics and mechanics. The „Zeitschrift für Angewandte Mathematik und Mechanik (ZAMM)" (Journal of Applied Mathematics and Mechanics), founded in 1921 by the German mathematician *Richard von Mises* (1883–1953) and today published by Wiley-VCH, Berlin, was pioneering in this respect (Fig. 7).

Wiley also followed this trend towards the basic principles of the engineering disciplines, as indicated by the publication of the „Proceedings of the Fifth International Congress for Applied Mechanics" in 1938. The book „Basic Structures" by *Francis R. Shanley* (1904–1968) and published by Wiley in 1944 is a good example of how basic principles of structural mechanics were interpreted in new ways in aircraft engineering. Lightweight construction, inherent in aircraft engineering and necessitated by steel quotas during the war, accelerated the paradigm shift from elastic to plastic calculation methods with the aim of quantifying and utilising structural reserves reliably. Wiley paid tribute to this development through four pre-eminent monographs:

– *John A. Van Den Broeke*'s „Theory of Limit Design" (1948)
– *Alfred M. Freudenthal*'s „The Inelastic Behaviour of Engineering Materials and Structures" (1950)
– *William Prager*'s und *Philip G. Hodge*'s „The Theory of Perfectly Plastic Solids" (1951)
– *Harold M. Westergaard*'s „Theory of Elasticity and Plasticity" (1952)

## Computers revolutionise engineering

The momentous process of the introduction of computer-oriented techniques for structural/mechanical analysis of structural systems in construc-

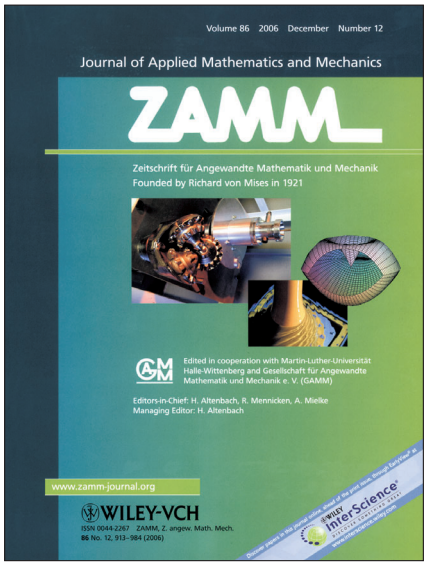


*Fig. 7. Cover of „Zeitschrift für Angewandte Mathematik und Mechanik (ZAMM)"*

tion, aircraft and ship building as well as mechanical engineering started just over 50 years ago. This development converged towards the industrialisation of structural/mechanical analysis, which can be regarded as a synthesis of rationalisation, algorithmisation and scientification. It is therefore not surprising that the German structural engineer *Konrad Zuse* (1910–1995) developed ideas for automating engineering calculations – particularly for statically indeterminate systems – as early as 1935 and six years later created the Z3, the first viable computer. With the advent of the computer, numeric techniques took centre stage in the theory formation of engineering sciences. The finite element method (FEM) developed in the mid 1950s in the context of aircraft engineering – associated with names such as *J. H. Argyris* (1913–2004), *M. J. Turner*, *R. W. Clough*, *H. C. Martin*, *L. J. Topp*, *R. G. Gallagher* (1927–1997) and *O. C. Zienkiewicz* – formed the logical core of modern numerical methods. It is worth noting that most of the names come from a civil engineering background. In 1969 *Zienkiewicz* and *Gallagher* established the „International Journal for Numerical Methods in Engineering“ (Fig. 8), the first journal covering computer-oriented numerical engineering techniques. This journal, published by Wiley & Sons, Ltd., Chichester, on a weekly basis, became an often-imitated model and had a profound influence on the world of engineering journals.

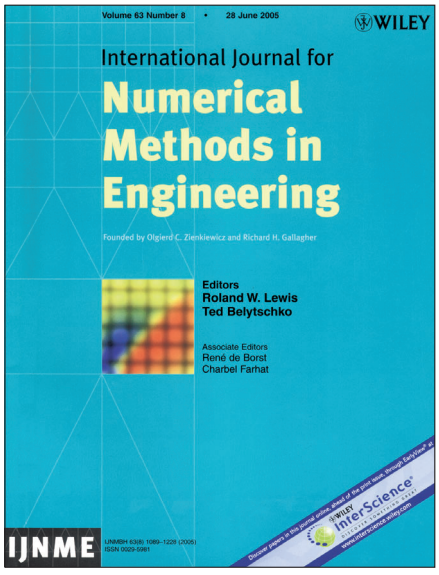


*Fig. 8. Cover of „International Journal for Numerical Methods in Engineering“*



*Fig. 9. Covers of Rudolph Szilard's two-volume monograph on structural mechanics; a) Vol. 1, b) Vol. 2*

In 1965 *O. C. Zienkiewicz* and *G. S. Holister* published their book „Stress Analysis“ with John Wiley & Sons, New York, and it was Wiley editor *Zienkiewicz* who extended FEM beyond solid mechanics and published the first FEM textbook in 1967, although not with Wiley. In 1982 (Fig. 9a) and 1990 (Fig. 9b) Ernst & Sohn published *Rudolph Szilard*'s well-known handbook „Finite Berechnungsmethoden der Strukturmechanik“ (finite calculation methods for structural mechanics). The two covers illustrate the basic idea of finite calculation methods. In 2004 the same author published a 1,000-page volume on the analysis of slab structures with John Wiley & Sons, Hoboken (Fig. 10).

The encyclopaedia is archive and anticipation, concluded the philosopher *Hans Jörg Sandkühler* from *Denis Diderot*'s (1713–1784) „Encyclopédie“ article in „Encyclopédie“, the outstanding literary monument of the age of enlightenment published by *Diderot* and *Jean Lerond d'Alembert* (1717–1783) between 1751 and 1772. The encyclopaedia is not just the sum of catalogued knowledge, but always also a normative programme. One example is the three-volume „Encyclopedia of Computational Mechanics“ (2004) by *Erwin Stein*, *René de Borst* and *Thomas J. R. Hughes*, published by Wiley & Sons, Ltd., Chichester (Fig. 11). It represents the first overview of this non-classic techno-scientific fundamental discipline that developed in the 1990s. In the preface the editors said the following about their motives: „After nearly half a century of developments in numerical methods, the field of computational mechanics has become sufficiently mature to collect the achievements and summarize the state-of-the-art in a comprehensive, authoritative major reference work. This idea, first conceived in 1999, has resulted in the 'Encyclopedia of Computational Mechanics'. It has been the intention of the editors and the publisher to pro-

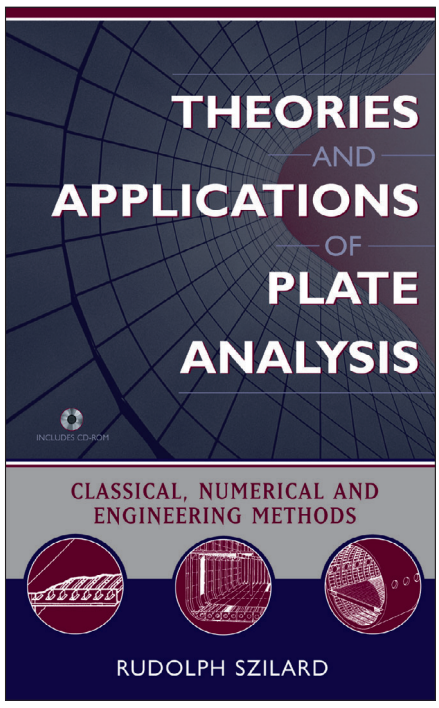


*Fig. 10. Cover of Rudolph Szilard's book on slab theory*

 

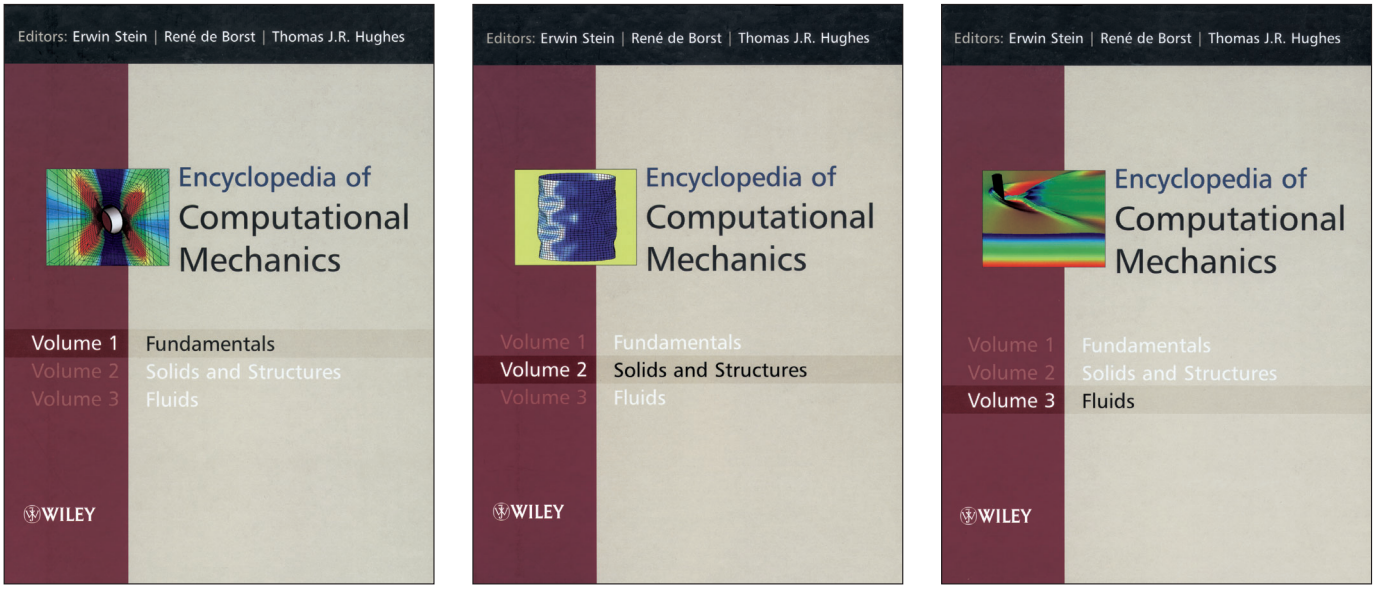


*Fig. 11. Covers of the three-volume „Encyclopedia of Computational Mechanics“*

vide the community with a systematic, well-organized survey of established as well as recently developed computational methods, covering applied and computational mathematics, computer science, the various branches of solid and fluid mechanics, and all the available discretization methods. Attention has also been paid to many engineering and other applications“. Unlike lexical publications, the „Encyclopedia of Computational Mechanics“ is therefore not simply a linear catenation of positive knowledge, it is a nonlinear network of knowledge assets with anticipative character.

However, the upheaval of the mathematical basis of engineering sciences induced by the computer was not yet completed. When it comes to structural engineering sciences, over the last few decades they did not limit themselves to the physical behaviour of structures and natural systems, but, according to *Peter Jan Pahl*, with computer-aided application of structural mathematics (particularly graph theory) for logical tasks relating to

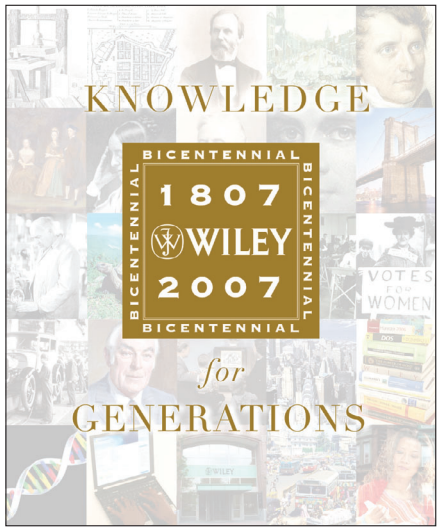


*Fig. 12. Cover of „Knowledge for Generations“, published on the occasion of John Wiley & Sons' 200th birthday*

design, organisation and management of construction projects and the utilisation of structures, they open up an important new area that will occupy research and practice over a long period and change the face of civil engineering: The paradigm of the technological in the shape of simulation of the design, calculation, construction, manufacturing, assembly, utilisation, conversion and disposal process thus enters the sphere of construction on a big scale.

Together with you, dear readers, Ernst & Sohn (Berlin), Wiley-VCH (Weinheim) and John Wiley & Sons will meet these challenges successfully, in line with the publishing family's generations-old tradition of conveying the know-how required for your work (Fig. 12).

Dr.-Ing. *Karl-Eugen Kurrer*
Chief Editor of STAHLBAU