

Chapter 2

Wilhelm Hector Richard Albrecht Lexis' Life and Work

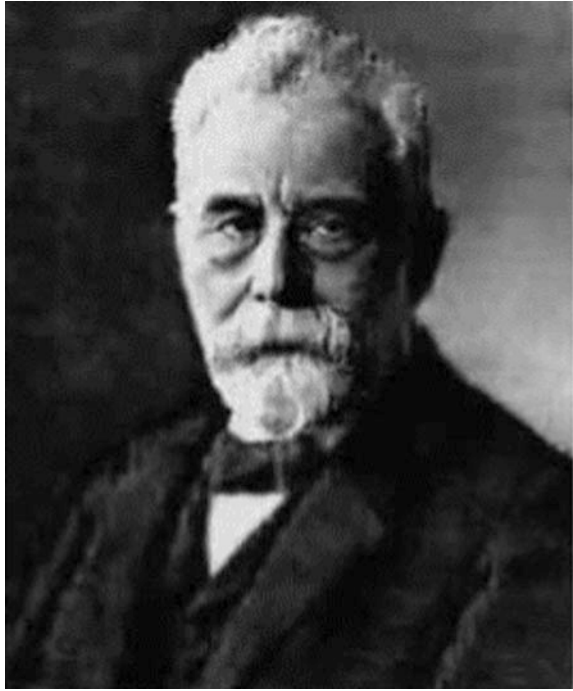
This chapter briefly introduces Wilhelm Lexis' biography by focusing on his childhood, studies, and work life. Places relevant to him as well as his working positions and publications are also listed and described.

Wilhelm Hector Richard Albrecht Lexis was born on 17 July, 1837 in Eschweiler, Germany, which is a town located nearby Aachen. He was a son of the physician Ernst Joseph Lexis and his wife Gertrud Stassen. Wilhelm Lexis married Pauline Emilie Lindenberg from Remscheid and they had three children (von Collani 2016; Statprob 2016). Based on the list of his interests, he could be considered a so-called Renaissance man. He studied at the Friedrich Wilhelm Gymnasium in Cologne. After secondary school, he devoted himself to study law and later went on to focus on mathematics and natural science at the University of Bonn. He graduated there with the thesis on analytical mathematics *De generalibus motus legibus* under advisor August Beer (1825–1863) in 1859. After a short period of teaching at Bonn Gymnasium, he moved to Heidelberg in 1860 where he worked with a famous chemist Robert Wilhelm Bunsen (1811–1899) at the university.

In 1861, Wilhelm Lexis moved to Paris to study social sciences, namely political economics. During this time, he made his living as an economic correspondent for a German newspaper. Between 1870 and 1871, Wilhelm Lexis was a journalist of the *Amtliche Nachrichten für Elsaß-Lothringen in Haguenu* and later on in Strasbourg (Zabell 1997; Hagemann 2012; Hertz 2001) (Fig. 2.1).

The departure for Paris was a turning point in his professional career because it led to Lexis' first publication devoted to foreign trade of France after the restoration of the monarchy (*Die französischen Ausfuhrprämien im Zusammenhange mit der Tarifgeschichte und Handelsentwicklung Frankreichs seit der Restauration: volkswirthschaftliche Studien*, Bonn 1870). As an economist, Wilhelm Lexis stressed that statistical methods are needed in economics because pure theoretical deductions could be far from economic reality. In addition, he was an opponent of the marginalist school and approved the objective theory of value (Hagemann 2012; Heiss 1968). He was an expert on finance and edited the first German encyclopedia

Fig. 2.1 Wilhelm Lexis.
Reproduced from O'Connor
and Robertson (2003)



of economic and social science (*Handwörterbuch der Staatswissenschaften*, Jena 1890–1894).

In 1872, Wilhelm Lexis was appointed to the post of associate professor in political economy at the German-language Imperial University of Strasbourg, which had just been established. At that time, he published an introduction to the theory of statistical demography (*Einleitung in die Theorie der Bevölkerungsstatistik*, Strasbourg 1875), in which his graphical representation of demographic data is included (more details are presented in Sect. 4.1.4).

In 1874, Lexis moved from Strasbourg to Dorpat¹ in the Russian Empire where he was appointed a professor of geography, ethnology, and statistics. During the two years he spent at the University of Dorpat, which belonged to the group of German-language universities until 1895, he published a demographic essay on the sex ratio at birth and probability theory (*Das Geschlechtsverhältniss der Geborenen und die Wahrscheinlichkeitsrechnung*, in: *Jahrbuch für Nationalökonomie und Statistik*, 27, pp. 209–245, 1876).

Between the years 1876 and 1884, Lexis held the chair of political economy at the University of Freiburg in Breisgau in Baden-Württemberg. During that time, he

¹Now Tartu in Estonia.

worked on the theory of statistical series' stability (*Zur Theorie der Massenerscheinungen in der menschlichen Gesellschaft*, 1877; *Über die Theorie der Stabilität statistischer Reihen*, in: *Jahrbuch für Nationalökonomie und Statistik*, 32, 1879). In 1884, Lexis changed his residence again because he was appointed a chair of statistics at the University of Breslau.² He remained there until 1887, and finally he moved on to work at the University of Göttingen. In addition, he became a chief editor of *Jahrbuch für Nationalökonomie und Statistik* in 1891.

Lexis died in Göttingen a few days after the beginning of the First World War, on 24 August, 1914 (Zabell 1997; Hagemann 2012; Hertz 2001; Statprob 2016).

Wilhelm Lexis is known not only for his contribution to demography, but mainly for his contributions to statistics. He is a refounder of mathematical statistics and is highly credited for his dispersion theory, which resulted in a study of variance. Furthermore, he showed that the assumption of homogeneity,³ which was approved by Adolphe Quetelet⁴ (1796–1874), who is known as the author of the rules for modern population censuses, is rarely fulfilled in social mass phenomena. Lexis emphasized the fluctuations in different demographic time series and proposed a dispersion coefficient Q ⁵ as a ratio of the empirical variance of the series to the assumed theoretical variance (de Gans and van Poppel 2000; Heiss 1968). If the dispersion is caused by chance, then Q equals 1. In the case that Q differs from 1, the fluctuations will be caused by the “physical” component rather than by chance. In his work, $Q < 1$ denotes hypo-normal dispersion and $Q > 1$ denotes hyper-normal dispersion, which is according to Lexis more common for social data (Hertz 2001; Statprob 2016). The coefficient Q , which he discovered while studying qualitative changes in populations over time, was a forerunner of the statistics of K. Pearson and R.A. Fisher and the analysis of Chi-squared variance.

The scope of Lexis' work is even wider. He published several articles on the educational system (e.g. *Die neuen französischen Universitäten*, Munich 1901; *Die Reform des höheren Schulwesens in Preussen*, Halle 1902) and on tuberculosis statistics (*Zur Statistik der Tuberkulose*, 1906, *Bericht über die Statistik der Tuberkulose*, 1909).⁶ Wilhelm Lexis, with Felix Klein (1849–1925), is also a founder of the first actuarial institute (Königliches Seminar für Versicherungswissenschaften) in Germany, which trained participants in both political economy and mathematics (von Collani 2016; de Gans and van Poppel 2000; Heiss 1968).

²Now Wrocław in Poland.

³Taken as a random sampling from a stable distribution.

⁴His full name was Lambert Adolphe Jacques Quetelet.

⁵A similar coefficient of divergence was constructed independently by French statistician Emile Dormoy in 1874.

⁶In: Bulletin of International Statistical Institute.

Publications⁷:

- From 1891 to 1897 Editor: *Jahrbuch für Nationalökonomie und Statistik*.
- Together with Johannes Conrad et al. Co-editor: *Handwörterbuch der Staatswissenschaften*, 6 vols. (Jena 1890–1894), 3. edition 8 vols. (Jena 1909–1911).
- *De generalibus motus legibus* (Bonnae 1859) (Lexis' Dissertation).
- *Die französischen Ausfuhrprämien im Zusammenhange mit der Tarifgeschichte und Handelsentwicklung Frankreichs seit der Restauration: volkswirthschaftliche Studien* (Bonn 1870).
- *Einleitung in die Theorie der Bevölkerungsstatistik* (Strasbourg 1875; electr. resource).
- *Zur Theorie der Massenerscheinungen in der menschlichen Gesellschaft* (Freiburg 1877).
- *Gewerkvereine und Unternehmerverbände in Frankreich: ein Beitrag zur Kenntniß der socialen Bewegung* (Leipzig 1879; Vaduz 1988).
- *Erörterungen über die Währungsfrage* (Leipzig 1881).
- “Der Breslauer Konsumverein und die Kleinhandelspreise”, in: *Untersuchungen über den Einfluß der distributiven Gewerbe auf die Preise* (Leipzig 1888) pp. 181–200.
- *Denkschrift über die dem Bedarf Preußens entsprechende Normalzahl der Studirenden der verschiedenen Fakultäten* (Berlin, ca. 1888).
- *Die Wirkung der Getreidezölle* (Tübingen 1889).
- *Anthropologie und Anthropometrie* (Jena 1890).
- *Die deutschen Universitäten*, 2 vols. (Berlin 1893).
- *Wissenschaftliches Gutachten über die Währungsfrage* (Berlin 1893).
- *Der gegenwärtige Stand der Währungsfrage* (Dresden 1896), English: *The present monetary situation* (New York 1896), with: “India and the silver question”, pp. 259–267, “International bimetallism once more”, pp. 268–281.
- *Die Besoldungsverhältnisse der Lehrer an den höheren Unterrichtsanstalten Preussens* (Jena 1898).
- *Die neuen Französischen Universitäten* (München 1901).
- *Die Reform des höheren Schulwesens in Preussen* (Halle 1902).
- *Abhandlungen zur Theorie der Bevölkerungs- und Moralstatistik* (Jena 1903).
- Editor: *Das Unterrichtswesen im Deutschen Reich: aus Anlaß der Weltausstellung in St. Louis*, 4 vols. (Berlin 1904), (1) *Die Universitäten im Deutschen Reich*; (2) *Die höheren Lehranstalten und das Mädchenschulwesen im Deutschen Reich*; (3) *Das Volksschulwesen und das Lehrerbildungswesen im Deutschen Reich*, mit Anhang *Wohlfahrtseinrichtungen im Anschluß an die Volksschule im Deutschen Reich*; (4.1) *Die Technischen Hochschulen im Deutschen Reiche*; (4.2) *Die Hochschulen für besondere Fachgebiete im Deutschen Reich*; (4.3) *Das mittlere und niedere Fachunterricht im Deutschen*

⁷According to von Collani (2016).

Reich, English: *A general view of the history and organisation of public education in the German empire* (Berlin 1904; repr. ca. 1978).

- *Das Handelswesen*, 2 vols.: (1) *Die Effektenbörse und die innere Handelspolitik* (Leipzig 1906, 1912; 1918; Berlin 3. edition 1923); (2) *Das Handelspersonal und der Wahrenhandel* (Leipzig 1906; Berlin 1923), Spanish: *El comercio* (Barcelona 1929).
- “Die Knappsche Geldtheorie”, *Jahrbücher für Nationalökonomie und Statistik* (1906) pp. 534–545.
- “Eine neue Geldtheorie”, *Archiv für Sozialwissenschaft und Sozialpolitik* 23 (1906) pp. 557–574.
- *Das Wesen der Kultur* (Leipzig und Berlin 1906).
- *Die Ausländerfrage an den Universitäten und technischen Hochschulen* (Berlin, Leipzig 1906).
- *Die allgemeinen Grundlagen der Kultur der Gegenwart* (Berlin 1906).
- Zwei Bände bei Paul Hinneberg (ed.), *Die Kultur der Gegenwart*, Teil 1, Hälfte 2, Abt. 1: *Die allgemeinen Grundlagen der Kultur der Gegenwart* (Berlin 1906; 1912); Teil 2, Hälfte 2, Abt. 10, 1: *Allgemeine Volkswirtschaftslehre* (Berlin 1910; Saarbrücken 2007). (Berlin 1926).
- “Systematisierung, Richtungen und Methoden der Volkswirtschaftslehre”, in: P. Altmann (ed.), *Die Entwicklung der deutschen Volkswirtschaftslehre im neunzehnten Jahrhundert: Gustav Schmoller zur siebenzigsten Wiederkehr seines Geburtstages, 24. Juni 1908* 1 (Leipzig 1908) pp. 1–45.
- “Geld und Preise”, *Festgabe zum 60. Geburtstag des Herrn Geheimen Justizrats Professor Dr. Riesser* (Berlin 1913) pp. 83–113.
- *Kredit und Bankwesen* (Berlin 1914, 1917, 1920, 1929; Leipzig 1924, 1929).
- *Währung* (Berlin 1914).

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