



Leon P. Bignold  
Brian L. D. Coghlan  
Hubertus P. A. Jersmann

David Paul von Hanseemann:  
Contributions to Oncology  
Context, Comments and Translations

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Authors:

Leon P. Bignold  
Division of Tissue Pathology  
Institute of Medical and  
Veterinary Science  
P. O. Box 14  
Rundle Mall, SA 5001  
Australia

Brian L.D. Coghlan  
Centre for European Studies  
and General Linguistics  
University of Adelaide  
Adelaide, SA 5005  
Australia

Hubertus P.A. Jersmann  
Department of Medicine  
University of Adelaide  
Adelaide, SA 5005  
Australia

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## Preface and Overview

This book developed from the historical part of a general study of theories of genomic disturbances which might induce normal cells to become tumourous. It was found that in 1890, David Paul Hanseemann (1858–1920) described a chromosomal theory of cancer based on a supposed pathogenic role of asymmetrical mitoses – essentially “non-disjunction” of chromosomes – in somatic cells. Hanseemann was also recorded as having coined the words “anaplasia” and “de-differentiation”, which have been used for the description of tumours ever since. However, little else could be found in the literature. In view of the resurgence of interest since the 1970s in the genomic abnormalities, including aneuploidy, of tumour cells a review of Hanseemann’s work was considered overdue.

The work specifically for the book began with a fortuitous meeting between Drs Jersmann and Bignold at the Royal Adelaide Hospital, South Australia. Dr Jersmann translated the titles of all Hanseemann’s publications which could be found in the Index Medicus 1885-1920, and the complete texts of the first articles on tumours (1890a, 1891a, 1891c, 1892a – chapters 7–10) and also of the last (1920). These works revealed that Hanseemann’s ideas were rational, logical, well-considered and relevant to what disturbances of the genome might cause the histopathological complexity of tumours. Professor Coghlan was then approached for help with the project and agreed without hesitation to translate the remainder of Hanseemann’s books and articles, as well as the relevant publications of other German authors. All three of us then worked together on the content and format of this volume.

Hanseemann’s contributions to oncology began in 1890 with the first comprehensive theory that the conversion of normal cells to tumourous ones involves the acquisition of intracellularly-arising abnormalities in their hereditary material (not Boveri in 1914, as has been commonly asserted). Next, Hanseemann emphasised the fact that – for many tumour types – there are *always* some cells which have hyperchromatic nuclei and some which have hypochromatic nuclei. Hanseemann noted that these changes of nuclear chromatism are at least partly due in turn to the nuclei having excess or reduced numbers of chromosomes respectively. This was the first assertion of significance for the phenomenon of “aneuploidy” for these types of tumours. While considering the significance of altered numbers of chromosomes in cells, Hanseemann noted August Weismann’s theory that differentiation of cells in embryos occurs by way of loss of chromosomal material. Hanseemann then proposed that asymmetric mitoses in normal cells result in cells which are both tumourous and suffer a “loss of differentiation” (*Entdifferenzierung*). Further, Hanseemann recognised that the particular type of differentiation which was lost during the change of a normal cell into a tumourous

one could not be the same type of differentiation which the previously-normal cell had acquired during its embryological development. Instead, Hansemann proposed that the dedifferentiation manifest by tumour cells is similar to the changes of oogenesis in the ovary, i.e. loss of “germinal epithelial” features during progress towards an independent cell (the egg). It was for this oogenesis-like biological process of supposed “de-differentiation” that Hansemann introduced the word “anaplasia”. Thus the processes of “anaplasia” and “de-differentiation” were in fact parts of an abstract, theoretical “superstructure” which Hansemann added on to his basic idea, namely that some alteration in the hereditary material of a normal cell converts it into a tumourous one. In this article too, he proposed even more abstract concepts of cell physiology – especially their “specificity” and “altruism”.

Within two years of Hansemann’s original article, Weismann retracted his theory of “differentiation by loss of chromosomal material”. Hansemann accepted this, and therefore had to admit that there was no known chromosomal or genetic basis available to account for “anaplasia” and “de-differentiation”. Hansemann (1892a) changed his definition of “anaplasia” accordingly. The result of the change of definition was to increase the already-existing confusion concerning the meaning of the words. However, for the rest of his life, Hansemann continued to insist that some genome-altering process is at work in tumour formation such that commonly associated morphological and physiological/behavioural abnormalities appear together at the same time in a normal cell when it is converted into a tumour cell. When expanding on all these ideas in a book (“Studies on the Specificity, Altruism and Anaplasia of Cells” – 1893c) Hansemann gave greater emphasis to the abstract concepts of “specificity” and “altruism”. In fact this book amounted to an attempted “systematisation of cancerous phenomena”, which can be interpreted as a “philosophy of cancer”.

Hansemann’s theoretical concepts were not well-received at the time. Nevertheless he began to describe the application of his theory of “anaplasia” to the practical problem of the diagnosis and nomenclature of tumours. His resulting book (“The Microscopic Diagnosis of Malignant Tumours” 1897o, 2<sup>nd</sup> edn 1902h) is of great significance for the history of histopathology as a part of the practice of medicine. This volume described how to diagnose malignant tumours using the supposed properties of the theoretical process: – i.e. anaplasia. Hansemann addressed the issue that tumour cells can vary in their degrees of abnormality not only between cases of the same type of tumour, but also in the same individual case of tumour. Previously the latter lesions had been described by Virchow (1888) as “mixed tumours” (different tumour types in the same lesion). Hansemann insisted that they are cases deriving from the same cell type but showing differences in degrees of “anaplasia” and “de-differentiation”. Therefore “The Microscopic Diagnosis...” (1897o, 1902h), together with Hansemann’s colour “Atlas” (1910k), were the original analyses of the histopathology of tumours in the ways which histopathologists have used throughout the world ever

since. Thus Hansemann was not only the original father (*Urvater*) of the idea of the endo-cellularly-altered-genome concept of tumour formation, but also of the current method of describing the microscopic appearances of tumours for diagnostic purposes.

Hansemann made yet further contributions to pathology and medicine. He was an exceptionally clear thinker on a variety of medical matters. Although all these topics cannot be pursued in this book, it may be noted that Hansemann made original contributions to the understanding of the causation of rickets (noted by Porter, 1999), and provided the first descriptions of malacoplakia and of cerebral cryptococcosis. Hansemann is a good example of the rigorously objective, rational and thorough intellectualism of many German scientists in the late nineteenth century. Indeed, he could be adopted as a model for any cancer theorist today because of his demand for *Gesamtheit*: that any acceptable theory of tumours must explain **all** the phenomena – clinical behaviour in the patient as well as the pathological, epidemiological and aetiological characteristics – of tumours.

To give some reasonable account of Hansemann and his ideas, it was decided (and our publisher agreed) that the main part of this book should be our translations and abstracts of Hansemann's works. However, we also have tried to understand many underlying issues concerning Hansemann and his *travail*. These are especially: What was his family, social and educational background? What cell biological knowledge did Hansemann rely on for his ideas? Why did Hansemann add a philosophical superstructure to his chromosomal theory? What were Virchow's possible influences on Hansemann? Why was Hansemann so concerned with "specificity" of cells? Why were the debates at the time so vigorous, sometimes to the point of being personal? Were there any particular reasons why Hansemann was forgotten during the twentieth century? Do Hansemann's ideas have relevance to cancer research today, and did Hansemann ask any important – if forgotten – questions concerning cancer biology?

We have addressed these questions in the six introductory chapters. We hope that they will be a sufficient guide for the easy understanding of the translated and summarised works which form the rest of the book.

As a last note, we are aware that among the translations, there is some repetition of ideas. However, we felt that if any text were deleted from any of the major articles or from "Studies..." (1893c) some readers would be concerned that something of interest to them had been omitted.

We are very grateful to our publisher, and particularly Dr Beatrice Menz, Senior Editor, for agreeing to publish such a large amount of translation in this way.

L. P. Bignold,  
B. L. D. Coghlan,  
H. P. A. Jersmann

Adelaide, South Australia, September 2006

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## Notes on the Works and Translations

Some German nineteenth century academic works achieved complexities of expression and thought which have been little rivalled at any time in the English-speaking world. In addition, the works of some German authors were notorious for lack of obvious structure, for repetitions, sudden changes in lines of thought, long sentences, complex grammatical constructions and so on. In brief, the styles of writing of Kant and Hegel (see chapter 2) cast a long shadow. As an example in the field of biology, W.M. Wheeler, the translator of Roux's Introduction to the *Archiv für Entwicklungsmechanik der Organismen* (1894) included a note:

“Besides the difficulties resulting from the great compactness of Professor Roux's style, there are others, not the least of which is the great conciseness of meaning with which all the terms are used, and the often very delicate qualifications of the leading ideas in the various paragraphs and sentences” (see Maienschein, 1986).

Some of these features are prominent in Hansemann's early work. Mainly, the problem is of *Eingesponnenheit* (“spinning into oneself”) which applies to spinning thoughts further and further while ensuring that no particle of an idea is left behind. Thus Hansemann's sentences frequently are very long, with many qualifications and continuous flows of ideas. The sequences of ideas, especially in parts of the first article (1890a) and in “Studies...” (1893c) often seem to have no order at all. In addition, and especially when he was unsure of the truth of his suggestions, Hansemann used complex qualifying clauses within clauses to make up long sentences (*Schachtelsätze*). He also exhibited the habit of “*mitdenken*” (“thinking along”), for example, when a verb is mentioned once, it in fact applies to the next clause as well. Some phrases are almost reminiscent of the more esoteric forms of old-style literary commentary. (This style became effectively obsolete after 1918).

However, in the later works, and especially when Hansemann was sure of his ideas, his writing for the greater part was simple and straightforward. In fact, Hansemann often repeated his points in successive sentences, in a way which is almost that of “*Faust auf den Tisch*” – “fist on the table”.

The aim of the present translations has been to render nineteenth century German into Victorian-Edwardian English, and evoke the spirit of the age, i.e. the comity of *fin de siècle* Europe. Frequently in Hansemann (1890a) and (1893c), we have found it necessary to break sentences and introduce colons, semi-colons and dashes to achieve readability. Excessive compactness of style has been countered with insertions of words, which are indicated in brackets, and if several words are introduced, “-eds” is included. Except for this, we have tried to preserve the style of the longer sentences which often achieves a cumulative effect (*Steigerung*).

We have tried to avoid presenting more meaning than was evident in the original (*hineininterpretieren*).

## On specific points:

- As was normal at the time, summaries in any form were lacking in most of Hansemann's articles. We have provided them.
- *Reiz* can mean either "irritation" or "stimulation", the latter even to the point of "attractiveness" as in *eine reizende Frau* (a really attractive woman). Virchow (1858) quite specifically used the word to mean irritation. In Hansemann's works on oncology, we think that *Reiz* has been used in the sense of an irritation, especially because it is always applied to carcinogenic agents, which are never "attractive".
- *Bindegewebe* has been rendered as "connective tissue" although the meaning is perhaps more accurately "supportive tissue" as indicated by the translator (M. Campbell) of part 1 of Hertwig's "The Cell. Outlines of General Anatomy and Physiology" (1892). *Richtungkörperchen* is not now used in German, but Hansemann used it initially for polar bodies in oogenesis according to Hertwig's description (Hertwig, 1890). Later, *Polkörperchen* ("polar bodies") was preferred.
- *Entdifferenzierung* means "de-differentiation", not "un-differentiation". Thus if one defuses an explosive mine, one uses the term *Entsorgen* – to take the fuse out. (In English, the usages are less strictly observed: thus "undressing" really means "de-dressing").
- *Konditional* we have translated as "conditional" and *Bedingung* we render as "pre-condition".
- *Offenbar* can mean either "apparently", "evidently", "clearly" or "obviously" and in many instances, Hansemann's precise meaning is unclear.
- We indicate our author as "Hansemann" when referring to his articles before 1902 and as either "Hansemann" or "von Hansemann" when dealing with articles or issues which arose after the family was ennobled "von" in 1902.
- Where emphasis in the original is indicated by increased font and spacing between letters (*Sperrdruck*), we have ignored the style if it applied to an author's name, and generally rendered it in SMALL CAPITALS if originally indicating emphasis.
- *Italics* have been reserved for all foreign language, and italics in inverted commas if the foreign words form a significant phrase, e.g. "*omnis cellula e cellula*". Where emphasis was indicated in original English-language material, generally such text has been transcribed in **Bold**. Otherwise, **Bold** has been mainly reserved for headings in our own text.
- For abbreviations such as "a. a. O", for which Latin abbreviations ("op. cit.") are often used in English publications, everyday English has been used.

## Table of Chronology

- 1790 David Justus Hansemann born in Finkenwerder, near Hamburg.
- 1793 Family moved to Heiligenfelde in the Electorate of Hanover.
- 1806 Napoleon defeated Prussia at the Battle of Jena. By the subsequent Treaty of Tilsit, Prussia lost approximately half of its territory. Napoleon created the “Confederation of the Rhine”; Hanover was divided and experienced very mixed fortunes.
- 1810 University of Berlin founded according to a plan prepared by August Wilhelm von Humboldt. The philosopher Friedrich Schleiermacher was first Rector.
- 1815 At the Treaty of Versailles Prussia regained the territories lost in 1808, and acquired additional lands, especially in the Catholic Rhineland. Kingdom of Hanover promulgated, within the new “German Confederation” which replaced the old “Holy Roman Empire”.
- 1817 Active German national-liberal and democratic sentiments began, exemplified by the mass meeting of German students on the Wartburg near Eisenach: Luther tercentenary.  
David Justus began trading in wool on his own account in Aachen.
- 1819 Carlsbad Decrees proscribed both national-liberal and democratic movements in German Confederation.
- 1821 Birth of Virchow.
- 1825 David Justus founded Aachen Fire Insurance Mutual Company.
- 1826 Birth of Adolph Hansemann.
- 1827 Discovery of the mammalian egg by von Baer.
- 1828 Raspail coined the phrase “*omnis cellula e cellula*”.
- 1829 Birth of Gustav Hansemann.
- 1834 Customs Union of German States (*Zollverein*) formed, leading to greater opportunities for the German commercial and industrial entrepreneurs.
- 1835 Practicable achromatic lenses for microscopes invented.  
First railway in Germany (Nürnberg to Fürth in Bavaria).
- 1837 Affair of the “Göttingen Seven” marked an attempt to resist illiberalism in German Academia.
- 1838 Müller published volume on the microscopic appearances of tumours.

- 1842–1854 Publication of Comte’s major works on Logical Positivism, including the concept of “Altruism”.
- 1844 Silesian weavers’ revolt against poor living conditions and industrialisation.
- 1845 David Justus elected to the Rhenish Provincial Assembly.
- 1847–8 Virchow sent to investigate epidemics in Silesia; reported that the causes were lack of sanitation associated with poor living conditions. Virchow evolved a radical “biological” social philosophy. Founded his journal later known as “Virchow’s Archives”.
- 1848 Liberal/Democratic Revolution in many European states. Publication of Marx’ and Engels’ “Communist Manifesto”. David Justus appointed Finance Minister in Camphausen Government of 1848. Virchow among the revolutionaries.
- 1849 Liberal all-German regime (“Frankfurt Parliament”). However, Virchow forced to leave Berlin; became Professor of Pathology at Würzburg. Subsequently illiberalism increased in German society and academia throughout the remainder of the century.
- 1854 Pasteur described fermentation of sugar by bacteria.
- 1855 In an essay on “Cellular Pathology” Virchow stated that all disease is due to disturbed physiological activities of cells.  
Addison described syndrome associated with adrenal cortical insufficiency.
- 1851 David Justus founded the Discount Bank.
- 1856 Virchow returned to Berlin as Director of Pathology at the Charité and Professor of Pathology at the University of Berlin.
- 1857 Control of the Discount Bank passed to Adolph.
- 1858 Birth of David Paul Hansemann, son of Gustav Hansemann.  
Virchow’s “Cellular Pathology” published, popularising “*omnis cellula e cellula*”.
- 1859 Darwin’s “Origin of Species” published in England.
- 1860 Pasteur enunciated the dictum: “*omne vivum e vivo*”.
- 1861 Virchow member of Prussian Assembly, cofounder of the Progress Party (*Fortschrittspartei*) in the Assembly in Berlin.
- 1862 Bismarck became Minister President in Prussia.
- 1864 Danish-Prussian War: Prussia gained hegemony over Schleswig-Holstein, the latter subsequently incorporated into Prussia.  
David Justus Hansemann died.  
Pope Pius IX issued the “Syllabus of Errors”, which was a precursor of the doctrine of papal infallibility (Vatican Council, 1870).
- 1865 Introduction of haematoxylin as a stain for nuclei.

- 1866 Defeat of Austria in the Austro-Prussian War led to exclusion of Austria from the German Confederation. Establishment of a new “North German Confederation” dominated by Prussia. Klebs, previously an *Assistent* to Virchow, accepted a position in Bern, and began research in bacteriological causation of disease, leading to later acrimonious arguments with Virchow.
- 1869 Foundation of the German Social Democratic Party.
- 1870–1 Franco-Prussian War. Annexation of Alsace-Lorraine; declaration of the German Second Reich, excluding Austria. Reparations from France were used extensively to build many new hospitals and associated medical schools throughout Germany.
- 1870s Beginning of *Kulturkampf* in which Virchow’s party joined with Bismarck, thus severely reducing the influence of Liberalism in Germany.  
Hansemann family moved to Berlin. Adolph became even more successful as a financier and industrialist, with a large house on the Tiergartenstrasse. David Paul attended gymnasia in Berlin. Gustav Hansemann published books on mathematics and philosophy.
- 1873 Widespread collapse of banks. After this, markedly prosperous period (*Gründerzeit*) for German Reich.
- 1875 Hertwig described fertilisation of eggs by single sperm.  
Strassburger described nuclear division occurring in plant cells. Vol. 1 of Herbert Spencer’s “System of Synthetic Philosophy” published in German translation.
- 1876 Microscopes with apochromatic lenses introduced by Zeiss.  
Koch discovered that anthrax is caused by a specific bacterium.
- 1878 Discovery of nuclear “filaments” “threads” “loops” (later named “chromosomes”).
- 1879 Accommodation was reached between Bismarck and the Catholic Church; end of *Kulturkampf*.  
Arnold described abnormal nuclear division in tumour cells.
- 1880s Bismarck introduced “welfare state” legislation – often considered a form of “state socialism”.
- 1881 Pasteur invented an anti-anthrax vaccine.  
Hansemann began medical studies, mainly in Leipzig, but with one semester in Kiel and one in Berlin.
- 1882 Flemming introduced the word “mitosis”.  
Koch invented culture of bacteria on solid substrates.  
Virchow opposed to almost all concepts of microbial aetiology of human disease, and did not support Koch when the latter was provided with extensive funds for research at the University of Berlin.

- 1884 Van Beneden introduced the term “chromosomes” and, along with other authors, described their replication by longitudinal splitting.
- 1885 Hansemann obtained his medical degree from Leipzig.
- 1886 Hansemann began as Professional Assistant (*Assistent*) to Virchow in Berlin.
- 1888 Weismann proposed that “differentiation” in embryonal tissues occurs by loss of chromatin material, while Hertwig and Nägeli believed that differentiation is achieved by sequential variations in the influences of the hereditary units (“gemmules” – Darwin; “plasmas” – Weismann; “ids” – Nägeli).  
Boveri described reduction of chromosome numbers during divisions of cells in *Ascaris* gonads.  
Death of Kaiser Wilhelm I. Accession of Emperor Friedrich III, who died three months later of laryngeal cancer. Virchow had initially suggested that the Kaiser’s lesion might be syphilitic. Emperor Wilhelm II ascended the throne.
- 1890 Hansemann published chromosomal theory of cancer suggesting that tumour cells “lose differentiation” in an “anaplastic”/oogenesis-like way.  
Koch announced the discovery of the tubercle bacillus.  
Kaiser Wilhelm II dismissed Bismarck from all his offices of State.
- 1891 Hansemann publicly disagreed with von Leyden about the value and safety of the tuberculin test for tuberculosis in humans.
- 1892 Weismann retracted his theory that “differentiation” occurs by chromosomal loss, leaving the Hertwig/Nägeli hypothesis unopposed.
- 1893 Hansemann published his book “Studies... etc” (1893c) in which many of the known biological features of cancer cells were grouped into the abstract concepts of “Specificity”, “Altruism” and “Anaplasia”.  
Radical social sentiments in Gerhart Hauptmann’s play “The Weavers” (based on the Silesian weavers’ revolt of 1844 – above) deeply offended Emperor Wilhelm II.
- 1894 Hansemann published an article suggesting that the use of diphtheria convalescent serum may be harmful to patients with this disease.
- 1895 Hansemann appointed prosector at the Friedrichshain Hospital, Berlin.
- 1897 Hansemann’s “The Microscopic Diagnosis of Malignant Tumours” published. Hansemann appointed Titular Professor (*Extraordinarius*) of Pathology, University of Berlin.

- 1900+ Hansemann published many attempts to clarify the meaning of “anaplasia” in the face of much misunderstanding. Fruitful lines of investigation into the aetiology (X-rays, chemical carcinogens, infectious agents) and treatment of cancer (especially with X-rays) were developed. Relatively speaking, interest in the precise nature of the abnormality in cancer cells declined.
- 1901 Gustav Hansemann (and hence David Paul) ennobled *von*.
- 1902 Gustav Hansemann died. Sutton and Boveri suggested independently that the pairing of chromosomes parallels Mendel’s “paired factors”. Second edition of Hansemann’s “The Microscopic Diagnosis ... etc”.
- 1905 Experimental genetic researches conducted by Morgan, Sturtevant, Wilson, Bridges and Muller on Mendelian genetics published but given little attention by pathologists in Germany. Hansemann and von Leyden expressed completely opposite views in a public debate on the nature of cancer.
- 1906 Hansemann attempted to clarify his views on the functions of tumour cells.
- 1912 Hansemann defended his idea of “altruistic” diseases. In doing so, he denied that the anti-diabetic factor is produced by the islets of Langerhans. Hansemann also drew simplistic conclusions from pathological observations concerning the functional capacity of endocrine glands. Hansemann stated that transplantable mouse tumours have no relevance to human cancers.
- 1914 Boveri’s book on the origin of malignant tumours was published. It was simplistic and selective in its approach. Its major idea was based on a mitotic mechanism already described by Hansemann. Outbreak of W.W.I, Hansemann served on the Eastern Front as Chief Army Pathologist.
- 1914–19 W.W.I broke previous cultural links between Germany and the rest of the world; also hindered and delayed reception in Germany of the new genetics principles which derived from the work of Morgan’s group. War and the epidemic of Spanish Influenza also depleted the numbers of German young men and the facilities for their education.
- 1918 Kaiser abdicated. Widespread popular reaction against the war. Armistice.

- 1919+ First German republic (Weimar). Government coalition led by Social Democrats (Scheidemann, Ebert). Civil unrest and assassinations of republican and left wing leaders.  
Hansemann returned to Berlin and resumed academic duties.
- 1920 Hansemann developed cancer of the throat and died.
- 1920+ Traditional German cultural and scientific value systems essentially unchanged despite some artistic and social adventurism. Boveri's supposed originality for a chromosomal theory of cancer stated by Borst and Bauer. This error was repeated by many later authors.  
Additional reasons for forgetting Hansemann were that he was considered "too philosophical". His ideas became harder to understand by younger scientists who were not aware of Hansemann's historical or scientific contexts.
- 1960+ Interest in chromosomes and DNA in cancer increased because many carcinogens are found to react with DNA and cause strand breaks; xeroderma pigmentosum is found to be due to a hereditary defect of DNA repair; genomic instability confirmed as a major phenomenon in malignant cells.

**Part I:**  
**Background**

# Chapter 1

## Family, education and career

### Family background

Scientists come from all socio-economic levels and family circumstances, and their careers follow various paths. These outcomes are sometimes in keeping with the abilities and industriousness of the scientists themselves, and sometimes not. The degrees to which these factors affect the quality of the contribution which each researcher makes to science is debatable, and not usually considered in detail in books of this type. However, David Paul Hansemann's family was very prominent in Germany at the time, and his scientific work and career have many unusual features. Hence many details of his background are given here, especially because all of the sources are in German and perhaps less accessible to readers who are unfamiliar with this language.

The Hansemann family name was recorded in the region of the city of Hanover in the middle of the sixteenth century (von Hansemann, 1968). There were, however, apparently few notable members of the family until the nineteenth century (Dabritz, 1954). David Paul's great-grandfather was a Lutheran pastor, who for a time had a parish at Finkenwerder near Hamburg, where David Paul's grandfather (David Justus Hansemann, 1790–1864, Fig. 1) was born. The family moved to the Hanover area in 1795, and later to other parishes in the region. After leaving school, David Justus was employed in the textile industry, and in 1817 he established a commission business in the wool trade in Aachen (buying wool in eastern Germany, and selling it to the newly-established woollen mills in the Rhineland) with capital from his own savings. In 1821 he married Fanny Fremerey (1801–1876) whose father owned a woollen mill in Eupen (now in Belgium). They had four daughters and two sons.

The times after the Congress of Vienna (1815) were favourable to enterprising Prussians. Napoleon I had abolished the residual aspects of feudalism in many German states, and because that system could not be restored, a free labour market was created. The Congress restored to Prussia the territories it had lost during the wars with Napoleon, and gave her considerable additional territory in the Rhineland. The resulting greatly increased opportunities for individual Prussians were enhanced again by the German customs Union (*Zollverein*) in 1834 and later economic reforms (Henderson, 1984; Lee, 1991; Brophy, 1998).

David Justus' prominence in business began in 1824–5 when he founded the Aachen Fire Insurance Co, on the model of the English mutual-shares company. Only the fourth of its type in Germany, the company rapidly expanded to Munich, becoming the Aachen and Munich Fire Insurance Society. In 1835 David

Justus founded the Rhineland Railway based in Cologne, and later established the Aachen branch of the Society for the Encouragement of Industriousness (*Arbeitsamkeit*). This society was a labour-organisation somewhat resembling the Cooperative Movement in England (Dabritz, 1954), and it later contributed a large sum to the foundation of the Technical College (*Technische Hochschule*) in Aachen (Dabritz, 1954; Corr and Richter, ND).

From the 1840s David Justus devoted himself to politics and political writing on the liberal side. At this time, the state governments of the Rhineland and the south-west of Germany were generally politically more liberal than those of Prussia proper and the overarching goal of the leading politicians in the region was constitutional monarchy for Prussia as whole and the smaller states and principalities.

In 1845 David Justus represented Aachen in the Rhenish Provincial Assembly (*Landtag*) which sat in Coblenz. In 1847, he was a member of the unified Prussian provincial assembly which was summoned to Berlin by Friedrich Wilhelm IV (b 1795, d 1861, r 1840-1858). This parliament demanded constitutional monarchy for Prussia and was dismissed by Friedrich Wilhelm, thus precipitating the 1848 Revolution in Prussia. (A similarity to the summoning of the Estates General to Paris in 1789 and the ensuing revolution may be discerned in this). David Justus was Finance Minister in the first revolutionary government led by Camp-hausen (1812–1896) (Hofmann, 1981), and on the latter's retirement in June 1848, formed a government with Auerwald (1795–1866). This government was dissolved later in 1848, when the conservatives regained control (*Reaktion*) from the revolutionaries (Taddey, 1977). Subsequently, David Justus was a member for several Rhenish provinces of a democratic assembly which was later convened to consider constitutional matters, but he withdrew entirely from politics in 1852 when that assembly was suppressed by the military, and royal autocracy was reinstated as the system of government (Dabritz, 1954).

David Justus Hansemann returned to a banking career, becoming Chief of the Prussian Bank 1848–1851, and founding the Discount Bank 1851. He died in 1864. In 1884, a statue of him (Fig. 2) was erected in the *Hansemann Platz* in Aachen.

David Justus' elder son and fourth child Adolph (1826–1903) was even more successful commercially than his father. At first, he was apprenticed in a textile firm in Leipzig, but after two years returned to the Rhineland. At 17, he entered the cloth factory of his cousin Wilhelm (mother's side) in Eupen. Adolph prospered at the Eupen firm, so that when David Justus entered politics in the 1840s, he left all financial affairs to Adolph. In the 1850s Adolph worked jointly with his father in the development of the Discount Bank, and became managing director and joint owner in 1857. Subsequently Adolph played a significant part in the financing of the Danish War (1864), the Austro-Prussian War (1866), and the Franco-Prussian War (1870–1). Adolph's other activities included raising loans for railways, expansion of the Discount Bank into the

other states of Germany, and then overseas, with branches in London, South America, East Asia, Italy and Romania. He indulged successfully in property speculation during the boom years (*Gründerzeit*) after 1870, and colonial enterprises. He was ennobled (allowing the use of the title *von*) in 1872. His wife Ottilie (née von Kusserow, 1840–1919) was responsible for a large donation for the foundation of a women's college (originally the *Viktoria-Lyzeum*, now *Haus Ottilie von Hansemann*) in Charlottenburg for the University of Berlin in 1908. Their home on the Tiergartenstrasse in Berlin was apparently palatial but has not survived. The street is now lined mainly by new embassy buildings. Adolph's son Ferdinand (1861–1900) and hence David Paul's cousin, was not significantly involved in commerce, but participated indirectly in nationalist politics, especially in the foundation of the German Eastern Marches Society (Dabritz, 1954).

David Justus' other son, Gustav (1829–1902, Fig. 3) married – in 1855 – Mathilde Vorländer (1827–1880), daughter of Dr med. Daniel Vorländer and Maria Anna Fuhrmann. Gustav was less inclined to commerce than his brother, but managed a woolen mill in Eupen (Fig. 4). The children of Gustav and Mathilde were (1) Fanny Marianne (b Eupen 1856–1923), m 1876 Paul Maximilian *Freiherr*<sup>1</sup> von Reibnitz (1838–1900) Vice Admiral ret., Law Knight in the Order of St John; and (2) David Paul (1858–1920), the subject of this book, who was born in Eupen (von Hansemann, 1968).

In the 1870s, Gustav retired from industry and became a mathematician and physicist in Berlin. He published three books (von Hansemann 1863, 1871a, 1871b), of which the last has considerable philosophical content. Gustav's side of the Hansemann family seems to have been financially comfortable, but not as wealthy as Adolph's family. Gustav was ennobled *von* in 1901.

Other descendants of the family were prominent in academic, commercial and diplomatic circles. For example, Daniel Vorländer (1867-1941) was born in Eupen as the fourth child of Gustav Hansemann's sister Sophie. This Vorländer became professor of chemistry at Halle, and discovered the first liquid crystal material (Buchwald, 1996).

David Paul Hansemann's education and medical career are detailed in the next sections. Here we can note that in 1885 David Paul married Elizabeth Amalie Wilhelmine Walter (b in Eisenach 1863, d in Berlin 1935), daughter of the *Post-Geheimrat*<sup>1</sup> Fritz Walter and his wife Theresa (née Frankenstein). David and Elisabeth had one child, a son (for further details see von Hansemann, 1968).

## Education

According to his curriculum vitae described in a letter held in the State Library in Berlin (Appendix A) Hansemann did not attend a primary school, but was tutored at home in the style of the high school for students intending commercial

careers (*Realschule*)<sup>2</sup> until the age of fifteen. At some unknown time, he decided on a career in natural sciences. When the family had moved to Berlin, David Paul attended a high school of *Gymnasium*-type in Charlottenburg<sup>3</sup>. He later went to the Friedrich-Wilhelm *Gymnasium*<sup>4</sup> in central (*Mitte*) Berlin, from which he matriculated at Easter in 1881. Throughout this period, he would have received substantial education in the Classics (Latin and Ancient Greek languages) according to the German educational philosophy of “(properly) formed-ness” (*Bildung*<sup>5</sup>). It is not known precisely when he decided to become a medical doctor, or whether his maternal grandfather (Dr med. Daniel Vorländer, see above) influenced this decision.

Hansemann’s undergraduate career studies occurred within the German university system<sup>6</sup> in general and the university medical school system in particular. David Paul began his medical course in 1881, and apparently spent three semesters in Berlin<sup>7</sup>, one in Kiel and three in Leipzig (Appendix A). During the long summer holidays of 1883, at Leipzig, Hansemann completed an elective in pathology, with Cohnheim<sup>8</sup>, and in the subsequent semester, carried out a special pathology assignment under Weigert<sup>9</sup>. The excellence of the German medical schools in comparison to those of all other countries in the period 1860–1914 is well recognised (see Bonner, 1963; Jaraus, 1982; Cocks and Jaraus, 1990). We assume that Hansemann would not have felt particularly out of place in his Medical School environment, because of all medical students, 17 % came from families of the “business elite”, 15 % from the “Government elite” and 23 % from “High Office” (Jaraus, 1982). We are unaware of his membership of the student voluntary organisations<sup>10</sup>, which were such a prominent part of German student life at the time.

The schools attracted students from all parts of the world, and particularly exerted a great influence on American medicine (Bonner, 1963). For example, the original staff of the Johns Hopkins Hospital were trained mainly in Germany (Sigerist, 1942) and the Mayo brothers, when developing the Mayo Clinic in Minnesota, made numerous trips to Germany to study the latest treatments (Clapesattle, 1941). Hun (1893) in his “Guide to American Medical Students in Europe” (1883) notes many details, ranging from the student accommodation available in the various German cities to assessments of the teaching at the various schools. The entries regarding the medical schools at which Hansemann studied include the following.

Leipzig. “The advantages for studying anatomy in Leipzig are probably unsurpassed in the world.” ... “The laboratories etc belonging to the university are handsome new buildings ...” ... “One of the most popular courses in Leipzig is that of Prof. Cohnheim on pathological anatomy. He holds a course on demonstrative pathological anatomy ...”

The academic staff at Leipzig included an illustrious group of medical scientists: His<sup>11</sup> (histology), Thiersch (surgery), E. L. Wagner (internal medicine),

Carl Ludwig (experimental physiology) and Weigert<sup>9</sup> (elementary pathological histology; infectious diseases). On a lighter note, Hun records that “Leipzig has a good opera and several good theatres”

Berlin. Hun (1883) records: “There is much rivalry between Berlin and Vienna ... but there will probably have to be an entire change in the method of instruction in Berlin before it will become very attractive to the foreign medical student. ...”

“Prof. Virchow gives systematic lectures on pathological anatomy, illustrated by specimens, daily in the winter semester, from 1 to 2 PM and in the summer semester from 11 to 12 M. In the first part of the hour, he exhibits any interesting pathological specimens which he may have, whether or not they are connected with the subject of his lecture; and then, while these specimens are passing about from student to student, he proceeds with his regular lecture. On Mondays from 8 to 10 AM in the winter semester, and from 7.30 to 9 AM in the summer semester, autopsies are made before the class by Prof. Virchow in the first part of the semester and by his students under his criticism during the last part of the semester. The examination of the body and viscera is very minute and accurate. On Wednesdays and Fridays at the same hour, Prof. Virchow exhibits macroscopic pathological specimens and lectures upon them, and passes microscopic sections of them about among the students. These exercises, and the autopsy exercise, are exceedingly valuable. On Tuesdays, Thursdays and Saturdays at the same hour, the assistant gives a course in which the students cut and examine under the microscope fresh pathological specimens. ...”

“Privatdocent Dr Friedlander (sic) gives a good course on pathological histology. Prof Jacobson gives a course on experimental pathological investigations. Dr Schiffer gives a course on experimental pathology and therapeutics.”

(For further notes on Virchow as a teacher, see below).

Kiel. This medical school is mentioned in Hun’s book (1883) only by a list of courses, and the names of the academic staff. The Professor of Anatomy from 1876 to 1901 was Walter Flemming (see chapter 3), who conducted so much of the research into chromosomes in this period, and presumably had a great influence on von Hansemann. Kiel was a wealthy city, the largest in Schleswig-Holstein.

Because Hansemann was an undergraduate in these departments, and was later accepted as an Assistant to Virchow, it seems likely that his education in pathology was thorough, and that he was academically gifted. However, before further studies, Hansemann did compulsory military service (Appendix 1 and Fig. 5).

## **Rudolph Virchow as a teacher**

After completing his university studies and discharging his military duties (see Appendix 1), Hansemann began his training in pathology with Rudolf Virchow (Fig. 6)<sup>12</sup> (1821–1902) in Berlin in the Institute (Fig. 7) associated with the Charité

Hospital<sup>13</sup>. Virchow was the most influential pathologist in the world at the time, and as well had been responsible for numerous improvements in public health in Germany. He was also a leading Liberal statesman in the Imperial Assembly (*Reichstag*), a prominent member of the Berlin City Administration and a founder of the discipline of physical anthropology, so that justly, his life continues to be celebrated in Germany. Several biographies (Ackerknecht 1953; Schipperges 1994; Andree 2002; Goschler 2002) have been published, and there are valuable entries in Garrison/Morton (1970) and Dhom (2001). A pathological society in New York was named after him. A bibliography of Virchow's medical and anthropological works was published in the year after his death (Schwalbe, 1901). Rather (1990a) has provided commentaries on Virchow's medical articles.

Virchow's career is sketched in note<sup>12</sup> of this chapter; his philosophical inclinations in chapter 2; his ideas on pathological histology in chapter 3; and his ideas on tumours in chapter 4. Virchow's personal and professional attributes are described in the biographies (above) and in English also by Byers (1989). Here is noted some additional material relevant to Virchow's possible interactions with his Professional Assistants (*Assistenten*)<sup>6</sup>.

In his early days as an academic, Virchow was undoubtedly a popular teacher and mentor (Ackerknecht, 1953). However, by the time Hansemann joined the Institute, Virchow may have been less tolerant of students (perhaps not an uncommon concomitant of increasing age). Ackerknecht (1953) quotes sources suggesting that Virchow had "rigidity of thought", "cold enthusiasm for truth" and a taste for polemics. Lubarsch (1921), writing in an issue of Virchow's Archives celebrating the centenary of Virchow's birth, suggested that when an elderly professor, Virchow's participation in seminars was irregular, and his contributions often pedantic, or irritable, or both. Oskar Israel (1903)<sup>14</sup>, Virchow's long-serving deputy at the Institute, in an obituary (Israel, 1903) made no mention of Virchow's personality, recording only his ability to disagree without personal insult, and his toleration of the ideas of others.

In general, however, Virchow was undoubtedly a courteous and tolerant person throughout his life, and was obviously very careful to express differences of opinion without giving offence. Virchow held a different opinion from many others on the topic of lineage specificity of cells. However, in his article (1884) on metaplasia Virchow's tone is even-handed and polite in discussing all aspects of this phenomenon in normal and tumourous cells. In dealing with Elie Metchnikoff<sup>15</sup> (Metchnikoff, 1921), whose views on the functions of leukocytes were diametrically opposite to his own, Virchow was supportive and courteous during their personal meeting at Messina (Bibel, 1982). Virchow accepted Metchnikoff's work for publication in his (Virchow's) Archives. An indication of Virchow's considerate nature also can be gained from letters to his parents, to his daughters and his wife, which were published by his daughter and have been translated and published in English (Rabl, 1907).

For Hansemann, Virchow seems to have obtained funding for a new third *Assistent* position immediately before Hansemann was appointed (Wirth, 2005). This implies, but does not prove, that Virchow had the position created for Hansemann. Also, Virchow's toleration of the ideas of others was probably the most significant aspect of his temperament. Hansemann's theory of cancer was contrary to Virchow's views on many points (chapter 5). Hansemann expressed something of this in his dedication of his "Studies ..." (1893c). Virchow (1891) mentioned the possible future significance of the study of karyokinesis in medical research, but did not mention Hansemann's work or any aspect of cellular genetics in an article on recent progress in science and medicine (Virchow, 1898). Nor in any article did Virchow refer to Hansemann's then-new system of diagnosis of malignant tumours according to the principle of anaplasia.

As a final point here, it seems an extraordinary coincidence that Hansemann should have had a grandfather who was a leader of the constitutional government in Berlin during the 1848 revolution, and as a mentor, the pathologist who was most famously of similar political sentiments.

### **Post-graduate career**

Hansemann obtained his Dr med. for work on tuberculosis of mucous membranes. It is not clear whether any dissertation was presented for this (see Appendix A; Wirth, 2005). Hansemann joined Virchow's Institute (Fig. 7) in 1886. He was apparently awarded his habilitation doctorate (*Dr habil.*<sup>16</sup>) in 1890, on the basis of his studies of mitoses in tumours, but no mention of any dissertation was made by Hansemann in his own publications, nor are they mentioned in the writings of other authors we have read. There is no record of such a dissertation in the British Library, Wellcome Institute Library or "The European Library" (on-line catalogues). Hansemann was awarded the University title of Lecturer (*Privatdocent*) at the University of Berlin in 1892 or 1893.

In 1895, Hansemann was appointed Prosector at the Friedrichshain Hospital<sup>17</sup> (Fig. 8). His photograph (Fig. 9) may have been taken at this time or later. The portrait of Hansemann's wife (Fig. 10) was painted in that year, and the family photographs (Figs 11 and 12) are from about the same time. Hansemann was awarded the title of Adjunct Professor<sup>6</sup> (*Extraordinarius, Titularprofessor*) in 1897. He gave lectures on Pathology at the main college in Berlin for post-graduate medical study (the *Kaiserin-Friedrich-Stiftung*<sup>18</sup>, Fig. 13) from its foundation in 1906. In the same year, he was appointed Director of Pathology at the then-new Rudolph-Virchow Hospital<sup>19</sup> (Fig. 14) in Wedding, Berlin and in 1912 made an honorary full University Professor (*ordentlicher Honorarprofessor*) of Pathology (Lüder, 2000).

Hansemann was secretary of the Committee for Cancer Research, and Editor of *Z. f. Krebsforschung*. For a period, he was co-editor of Virchow's Archives.

During his career, he had arguments with others, especially Ribbert and Lubarsch as described in chapter 6. These arguments, especially with von Leyden (chapter 12 and Appendix A), may have affected his promotion at the University of Berlin. In the profession and society as a whole, the arguments may have been less important, as indicated by the positions he held (see above) and the recognition he received by virtue of his appointment as *Geheimrat*<sup>1</sup> for medicine in approximately 1912. His involvement in the anti-Ultramontane movement<sup>20</sup> was probably of little significance to his career.

In W. W. I Hansemann (Fig. 15) served as a General in the Pathology services of the Army on the Eastern Front, being awarded an Iron Cross First Class. After the war, he returned to his duties at the University of Berlin, but died, on August 28<sup>th</sup>, 1920 of laryngeal carcinoma. His body was buried in the family mausoleum in the old St Matthäus Cemetery in the district of Schöneberg, Berlin (Fig. 16).

An obituary of 1937 (Appendix D) suggests that Hansemann wrote a “personal account” while serving during the war, and after the war was a favourite of returned German soldiers at Medical School, and this is also stated by Wirth (2005). However, David Paul’s grandson has no knowledge of this manuscript, and we have not been able to establish whether or not the document existed, and thus have not been able to examine its contents.

We have found no evidence of Hansemann having racist or anti-Semitic sentiments. In his book “Origin and Pathology” (1909f) which would have been the probable place to express such views, there is no mention of Jewish people, or of human “races” at all, except in relation to the inherited disorder of excessive hairiness (hirsutism).

## Notes to chapter 1

- 1 *Freiherr* indicates the lowest order of hereditary title similar to that of a baronet in the English system.

The title of *Geheimrat* derived from Privy Councillor (*Geheimer Rat* – a member of the supreme organ of government under the Prince or equivalent ruler in many German States. In the nineteenth century in Prussia, it was used to indicate a high official (e.g. *Geheimer Finanzrat*) but also awarded as a mark of distinction to persons with no governmental function at all (e.g. that of *Geheimer Commerzienrat*, for an eminent man of commerce). The system was abolished in 1918. References: Encyclopaedia Britannica, 11<sup>th</sup> edn (1911); Schwarz (1943).

- 2 By the 1870s, most states in Germany had three types of high schools, which, with some regional variations, had curricula as follows.

(i) *Hauptschule* (sometimes *Realschule*), which gave a basic secondary education in six years.

(ii) *Realschule* or *Oberrealschule* and sometimes *Realgymnasium* (if it included some study of the classics) offered a nine-year course, for those intending a career in commerce, and also for engineers, technicians and scientists intent on tertiary education in Technical Colleges (*Technische Hochschulen*).