Wyższa Szkoła Bankowa we Wrocławiu

Aneta Daniel

O początkach i rozwoju neurolingwistyki. Studium z zakresu historii lingwistyki

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On the Beginnings and Development of Neurolinguistics. A Case Study in the Domain of the History of Linguistics

Doctoral dissertation
written under the supervision of:
prof. dr hab. Piotr P. Chruszczewski

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0. Introduction

The origins of neurolinguistics, the study of the human brain, and its connection to languages can be found in the research conducted by German scientists such as professor doctor Carl Wernicke [1848–1905] and professor doctor Alois Alzheimer [1864–1915] before the Second World War at the Universität Breslau, today known as the University of Wrocław. Many publications and papers published in pre-war Wrocław (Breslau) indicate that neurolinguistics had its beginnings there. The research's main objective is the presentation of a group of neurologists and psychiatrists - the students of Carl Wernicke who lived in the city and conducted their research on the brain, based on archival documents.

0.1 Subject matter

The subject matter of the thesis is the exploration of the origins and dynamics of the development of language studies which have been labeled as neurolinguistics. It is worth mentioning that neurolinguistics' origins can be found in the research conducted by German scientists before the Second World War in the Universität Breslau. A dominant figure in these studies was professor Carl Wernicke, whose students continued and creatively developed projects of their master within this area. From the scientific perspective, the fact that the type of research I discuss in my dissertation has not been carried out yet is extremely interesting. Language is an indispensable element of culture and is vital in perceiving the environment by every person's cognitive system. However, it remains unknown whether it evolved for social purposes, for connecting social groups or providing instructions. Language can also be congenital – this is indicated by the fact that babies are born with the necessary knowledge about the types of sentences and the ability to understand ambiguous expressions.

However, none of the theories will work if there is no suitable environment for a child to develop this skill. The cases of feral children prove that the human mind can be a *tabula rasa* and that parents perform a crucial role in language

development. Studying the way people acquire language is essential in the analysis of speech disorders. It is true that in many aspects all languages are similar to one another. It has been proven by the theory of universal grammar (Chomsky, 1986, as quoted in Crain 1999: 16–17). It is believed that every human mind is very complex, and – thanks to the innate knowledge – people can absorb languages. O'Grady (2001: 439) presents the basic Chomsky's argument concerning universal grammar and innateness. According to the theory, children are born with all the knowledge about the categories in the grammar of every language. This set of innate categories is common to all languages, which create a universal grammar.

Crain (1999: 16–17) provides further evidence for Chomsky's hypothesis, stating that a child cannot be exposed to all possible ambiguous and abstract expressions during childhood. Grammars are too complex and too abstract to be learned in a short time. However, people can understand the contextual ambiguity of sentences; therefore, it has to be innate knowledge of the category of phrases that helps them understand it. In the opinion of Yang (2006: 27–39), languages are similar but differ in terms of the parameters that create a grammar. An interesting fact related to the functioning of the human brain is that language learning takes place in the same way as acquiring biologically controlled behaviors. The findings of Eric Lenneberg (Lenneberg 1967 as cited in Bergman 2007: 311–313) concerning animal behaviors show the similarity between acquiring biologically controlled behaviors and language acquisition by children. Biologically controlled behaviors require a suitable environment for the proper development of skills – a valuable environment for children are their parents.

Interestingly, a child does not need to be specifically taught a language to speak it; it just has to be exposed to it is parents' language, which results in the acquisition of words and grammatical structures. Besides, language learning is not the result of a conscious choice, because children learn languages instinctively. However, a child may not learn a language because the innate behaviors are activated to more or less at twelve years old. This means that if a child is not exposed to any language up to this point, it will never acquire language skills and will not communicate with the rest of the society (Bergman 2007: 313). However,

without some factors, one can never develop biologically controlled behaviors. The cases of feral children worldwide, raised by animals away from culture and civilization, show that such children behave like animals with which they have grown up (Candland 1993: 15). Unfortunately, feral children cannot acquire any language or master human behavior later in their lives.

0.2 Research perspective

The research perspective I adopt in the dissertation is the history of linguistics (with the particular reference to one of the sub-disciplines of linguistics, which is the early Wrocław neurolinguistics). Neurolinguistics (in Polish: *neurolingwistyka* or *neurojęzykoznawstwo* – I use both terms interchangeably; a detailed explanation and a description of both are found in my dissertation) was initially included in the scope of psychology and neuroscience. Professor Carl Wernicke, a German physician, anatomist, psychiatrist, and neuropathologist, is primarily known for his influential research on aphasia. His research and that conducted by professor Paul Broca have led to breakthroughs in understanding of brain functions, particularly speech. Years later, the theses of the pioneers of cognitive neurology (Carl Wernicke and Paul Broca) were developed by other neurolinguists such as Heinrich Neumann [1814–1884 Karl Heilbronner [1869–1914], Otfrid Foerster [1873–1941], Karl Bonhoeffer [1868–1948], and Alois Alzheimer [1864–1915]. Sigmund Freud [1856–1939] is another scientist whose research contributed to the creation of neurolinguistics. The publication titled On Aphasia (1891) was his first book. In the monograph, Freud questioned the main postulates considered correct at the time (including those preached by Carl Wernicke and Paul Broca), claiming that their understanding of aphasia is no longer valid (Caplan, [1987] 2003: 80). Freud believed that the theses promoted by the traditional German school of psychology, including Wernicke's theories, were wrong because they remained at variance with the psychological and physiological concepts, particularly those concerning aphasia (Caplan 1987: 80). However, it is worth noting that Freud

analyzed the interpersonal and social elements of language acquisition and its meanings because he perceived language just as a part of the brain activity.

One of the prominent figures of linguistics nowadays is Professor Ernst Frideryk Konrad Koerner [1939] – a contemporary world linguist. He was born just before the Second World War, on February 5, 1939, in the Mlewiec family estate in Polish Pomerania, less than 30 km north of Toruń. Koerner has been Professor Emeritus at the University of Ottawa since 2001. He has also lectured at universities in Arizona, Austin-Texas, Edinburgh, Hong Kong, Indiana-Bloomington, New Mexico, Prague, Regensburg, and Trier. Professor E.F. Konrad Koerner is a founding member of Henry Sweet Society for the History of Linguistic Ideas (Oxford, 1984) and the North America Association for the History of the Language Sciences (Urbana-Champaign, Illinois, 1987). Koerner initiated historiographic scientific societies in Brazil, France, Spain, the Netherlands, Mexico, Germany, the USA, Great Britain, and Italy. In recognition of his work, Professor Koerner was honored with nominations to many prestigious organizations, such as the International Consultative Council of the Geschiedenis van de Taalwetenschap Foundation (Leiden, Netherlands 1991) and honorary doctorates from the Universities of Sofia, St. Petersburg, and Edinburgh. It is worth noting that Professor Korner is also an elected member of the Royal Scientific Society of Canada, the Royal Arts Society of Great Britain, and a resident member of the Dutch Institute of Humanities and Social Sciences of the Royal Academy of Sciences. In 1995, the Nicolaus Copernicus University in Toruń awarded Professor Koerner with the Medal for Merit to the University.

Professor E. F. Konrad Koerner's scientific output is difficult to discuss in full as the bibliography is almost 170 pages long. The professor not only edits all these volumes but also often publishes his own articles. As it can be seen, the scale of Professor Konrad Koerner's scientific interests is extensive: from general linguistics through communication semiotics, psycholinguistics, anthropolinguistics, Creole studies, linguistic typology to historical linguistics. However, the Professor's most essential works, translated into several languages, concern the historiography and history of linguistics from the earliest times to the

present day. Professor Koerner is the first linguist to pay attention to this critical aspect of linguistics and to create a methodology for independent research on linguistics. It is impossible to overestimate that in his numerous works on the history of linguistic research, Professor Konrad Koerner did not omit but also drew attention to Polish linguists' achievements.

Moreover, as the Professor published in English, German, and French, he acquainted the scientists from around the world with innovative linguistic thoughts of those times, unknown to the broader public, with the representatives of the so-called Kazan school from the end of the 19th century: Mikołaj Kruszewski and Jan Baudouin de Courtenay. On the Professor's initiative, works on these pioneers of Polish linguistics were published, and Kruszewski's selected works were issued in German and English translations. Professor Konrad Koerner is a widely-recognized linguistics authority and is known for his numerous publications and conference speeches, and guest lectures on almost all continents. Finally, while working at several different universities, the Professor had a reputation as an excellent educator. Many of his students are today well-known linguists working in universities around the world.

0.3 Research material

The research material consists of archival records documenting the work of professor Carl Wernicke's and the researchers from Breslau (presently Wrocław), one of the fastest-growing cities in Europe. The capital of Lower Silesia has repeatedly changed political and cultural connections. Central Europe, of which Wrocław is a part, has been shaped by many experiences, including a rich mix of nationalities and cultures. Since two competing visions – of the “German city of Breslau” and the ”Polish city of Wrocław” – still exist until this day, this city is sometimes referred to as the microcosm of Central Europe (Davies and Moorhouse 2002). The term “microcosm” accurately reflects the reality, because historical events have contributed to the way Wrocław is currently perceived – that is, as a multicultural and multilingual city that has much to offer. It is worth noting that

those were the beginnings of antisemitism in Breslau. The publication *Word and Actions: Rethinking the Social History of German Antisemitism* (Breslau, 1870-1914) describes the period when Carl Wernicke lived in Wrocław. However, the researcher is poorly recognizable in Poland by people unfamiliar with science. This scientist was a pioneer of neurolinguistics, physician, anatomist, psychiatrist, and neuropathologist in Breslau. Even though he is perceived as the pioneer of neurolinguistics, few people know the details of his life. Many of his theses and articles exist that have survived in the libraries in Wrocław and worldwide and contribute to the neuroscience development. Carl Wernicke became a medical doctor in 1870, and his doctoral thesis *Erkrankung der Inneren Kapsel. Ein Beitrag Zur Diagnose der Heerderkrankungen*, devoted to hereditary diseases, was published in 1875 in Breslau.

0.4 The outline of the plan of the doctoral dissertation

The thesis's main objective is history of neurolinguistics. The research on language and brain was conducted by Carl Wernicke and his students – who contributed to the development of neurolinguistics in Breslau. The scholars were mainly neurologists and psychiatrists and dealt with the branch of science that had not been named neurolinguistics at that time. The scholars are analyzed as the group of researchers who have contributed to Wrocław's breakthroughs in psychology and neuroscience. In the first chapter of the dissertation, the history of research on the brain and speech analysis is presented, including psychology and neuroscience – areas from which neurolinguistics has derived.

In the second chapter, the archival materials found in Wrocław, Berlin, and Frankfurt am Main are presented. The primary academic institutions such as the University of Wrocław, Charité Institute, Berlin, and Frankfurt University, where significant discoveries on language and brain took place, are mentioned. In that section, academic neurolinguistics in Breslau is described. There the life of the leading figures such as Heinrich Neumann [1814–1884], Carl Wernicke [1848–

1905], Karl Heilbronner [1869–1914], Otfrid Foerster [1873–1941], Karl Bonhoeffer [1868–1948], and Alois Alzheimer [1864–1915] is presented, including selected archival materials obtained from the scientific institutions. The archival materials' location is described, which can help researchers find the materials of interest.

In the third chapter, language impairments are described: mainly aphasia, which used to be the subject of Wernicke's research. However, other disorders such as autism, Tourette syndrome, and Alzheimer’s disease are also presented. Lastly, rare neurological diseases are analyzed.

1 Linguistics and contemporary brain sciences: an outline

To better understand the significance and importance of neurolinguistics, the necessary components of the analysis, such as linguistics, psychology, neurology, and psycholinguistics, are covered. The evolution of what is now recognized and understood as neurolinguistics has had a significant influence on these disciplines. The founders of the studies are introduced, and relevant results obtained by them are discussed. It would be difficult for people to understand how languages work and how specific words construct beliefs without studying linguistics. Nonetheless, in some cases, the mind of a person cannot function properly; thus, for that reason, the value of psychology is addressed. People can understand how the human mind functions, including how words are used, thanks to psychology. A properly functioning mind is primarily dependent on a healthy, well-developed brain. Many neurological disorders affect human speech and languages, and are studied by neurology. Whereas, psycholinguistics studies the relationships between psychological processes and linguistic behavior, such as learning a language.

Nonetheless, these studies are paired with neurolinguistics – the core theme of the dissertation. Neurolinguistics is a science that studies the neural processes inside the human brain that regulate language activity and speech changes in impaired brains, which is at the frontiers of linguistics, psychology, and neurology. However, neurolinguistics' fundamental attempt is to construct a model of the relationship between speech and aspects of brain functioning.

1.1 Linguistics

Language serves as a means of cognition and communication: it enables humans to think and to cooperate with other people in the community (Widdowson, 1996: 3). Although language is essential to humankind and has served to extend control over other parts of creation, it is not easy to specify what makes it distinctive (Widdowson (1996: 4). Other species communicate as well. Birds signal to each other by singing, bees by dancing, and interestingly, these song and dance routines can be very elaborate (Widdowson, 1996: 4). Noam Chomsky's argument for the genetic uniqueness of language explains several inexplicable facts. One of them is the ease with which children learn their language. They rapidly acquire a complex grammar that goes well beyond imitation of any utterances they might hear. Children do not 'pick up' a language but use the language around them to develop rules. The acquisition is a matter of accumulation and regulation (Widdowson, 1996: 12). According to Chomsky, principles define several general parameters of language that are assigned different settings by individual languages. The parameters are innate, predetermined part of the genetic make-up of human beings. The settings are the result of varying environmental conditions.

The meaning of language can only be understood concerning the culture and its context. There is a link between a language and the native environment because language is not a barrier to thought (Mühlhauster, 1990: 70). Two representatives of researchers reflecting on the culture's role in a language were Edward Sapir [1884–1939] and Benjamin Lee Whorf [1897–1941]. The so-called Sapir-Whorf hypothesis contributes to the discussion on the context of culture. Sapir (1929 cited in Mühlhauster, 1990: 75) was convinced that language could only be interpreted within a culture, suggesting that no two languages are similar enough to represent the same reality. There were traditionally two versions of the Sapir-Whorf Hypothesis: the strong and the weak. According to the strong one, language determines how the user thinks, suggesting that bilinguals would probably change their opinion of the world while changing the language (Sapir, 1929 cited in Mühlhauster, 1990: 75). The weak version of the Sapir-Whorf theory

suggests that language can influence thought (Mühlhauster, 1990: 74). Sapir (1929 cited in Mühlhauster, 1990: 74) believed that the key to cultural reality was in the lexicon. Whorf (1956 cited in Mühlhauster, 1990: 75) based on Sapir's work and his theories on the form and the function of language tense systems. A language affects the transition of specific cultural values.

Although it is possible to separate language and culture, the implications that such a separation brings should be taken into consideration. It is worth pointing out that both structures of a language and cultural values determine the language usage; therefore, it should not be claimed that a relationship between a language and culture does not exist. Naturally, language is characteristic only to humans (Smith, 1999: 26). Thanks to thoughts and understanding, people have developed creativity, which is a part of human nature. Humans' complexity results from the genetic determination of a subset of physical properties (Smith, 1999: 50). One of Chomsky's (1986 cited in Smith, 1999: 50) striking observations is that there is no reason to suppose that the genetic determination of human's mental system is any different from the genetic determination of the complex physical systems and human nature, including the language faculty and aspects of morality.

Nonetheless, there are different approaches. It is believed that a language is what in speech is simultaneously abstract, social, and permanent, enabling the creation of a complete construction using grammar (Milewski [1965] 1967: 5–13). Grzegorczykowa (2007: 12), on the other hand, states that language is not abstract, but it is a system of conventional signs, phonic, capable of communicating about everything. It means that language is universal. On the whole, language is a way of human behavior, that is, a form of transmission of thoughts and experiences and the form of thinking and world cognition (Grzegorczykowa, 2007: 12). Thoughts and experiences can only be shared through language, hence thoughts and experiences are vague until they become verbalized; therefore, without a language, life cannot function (Shi-xu, 2005: 23). Van Dijk ([1977] 2000: 3) points out that language use is not limited to a spoken language but also involves the written or painted ones. Undoubtedly, the written language is a type of interaction. Although the participants do not usually interact face-to-face and seem to be passively

involved in the interaction, it does not mean that readers are less active than listeners (Van Dijk, 2000: 3). However, there are many differences and as well similarities between the use of the spoken and the written language.

There is a significant difference between approaches to language. Formalists such as Chomsky (1986 cited in Schifrin 1994: 22) tend to regard a language as a mental phenomenon, a common genetic, linguistic inheritance of the human species, and functionalists tend to regard it as a societal phenomenon. Formalists are inclined to explain children's acquisition of language in terms of a human's capacity to learn languages. On the other hand, functionalists are inclined to explain it in terms of developing the child's communicative needs in the society and to assume that a language has functions that influence the linguistic system's organization (Schifrin, 1994: 22). On the other hand, formalists argue that although language may have social and cognitive functions, these functions do not impact language's internal organization.

A language can be both a creative and destructive communication tool; nonetheless, its message is the most crucial element. A language is socially useful but also dangerous and ambivalent. People have to know how to use speech to properly transmit messages consciously. To realize the communicative function, both the sender and the recipient, who remain together in a communicational situation, are needed (Albinger, 2015: 22). Erasmus (1542 cited in Albinger, 2015: 29) highlights the features of the conversation participants. These days people are not limited to one culture or society because of foreign languages' command and can assimilate with other nations quickly and learn from their knowledge and abilities. However, today's most significant concern regarding the scientific discoveries is that almost everything known about the human mind and the human brain is based on studies of usually English-speaking undergraduates at universities. It means that all information regarding the human mind is incredibly narrow and biased; therefore, more linguistic input should be contributed by people using different languages. A language people speak indeed defines the mind, especially from the psychological perspective.

A significant influence a language has on thoughts and how it may influence cognition is covered in the basic assumptions of modern psychologists; therefore, the concept of psychology needs to be covered and presented to provide a full overview. Regarding parameters, all languages are alike; in respect to settings, they are all different. In an acquisition, children do not need to induce the particular rules of their language and only base on the language data they hear. What they do is use the data to set the parameters which they are already innately provided. It is as if they were born equipped for the reception with all the wavelengths in place and all they need to do is tune in. It should be noted that there is nothing especially novel about the idea that human beings are born with a cognitive learning capability that is wired genetically into the brain. What is different and controversial about this theory of innate universals is Chomsky's claim that we are equipped with a specific linguistic program that is unique to the species and different from any other capability Widdowson, 1996: 13). It follows from this view that language learning is not explicable as one among many aspects of general intellectual development, but only as of the activation of a particular language acquisition device and as the growth of a separate mental organ.

Because of its complex association with the human brain and culture, language might be viewed as distinctive. It is both abstract knowledge and actual behavior, and it is connected to both cognition and communication. We can try to define its essential character by mentioning a variety of design characteristics, such as its arbitrariness and duality, the fact that it is context-independent, that it works in different media (speech and writing) and at different organizational levels (sounds, words, sentences), and so on. The phenomena is both ubiquitous and elusive as a whole (Widdowson, 1996: 13). Language, at the same time, allows for nonconformist self-expression also. Individual movements are always possible. In the normal run of events, a person speaking French, Swahili, or Chinese, for example, will generate instances of that language, or combinations of words, following the underlying systems of rules and established meanings that comprise the linguistic codes in each case. However, they are producing unique expressions in the language by exploiting the code's potential. Although individuals are

constrained by the conventions of the code and its use, they exploit the potential differently on different occasions and for different purposes (Widdowson 1996: 20–21). But this conscious exploitation is not the only variation source. The pattern of a person's use of language is as naturally distinctive as a fingerprint.

Moreover, even though spoken utterances repeated by the same individual seem similar, they are never acoustically identical in every detail. It is socially acceptable to presume that some things are the same, even if deeper examination reveals that they are not. The argument is that language is a very broad and abstract phenomena from one perspective. Simultaneously, it is very particular and variable if we look at the actuality of the linguistic behavior. Since social control is a necessary condition of individual creativity, there is no contradiction here. It is merely that the nearer you get to actuality along the scale of idealization, you discern more differences as the more general abstractions disappear (Widdowson 1996: 20–21). As a result, marking off limiting points along this scale to determine the extent of the linguistic investigation is convenient.

1.2 Psychology

Psychologists are also interested in the study of the human brain. Theoretical positions have influenced the advancement of research on mental illness. The study of mind and action is known as psychology. The study of conscious and unconscious phenomena, as well as feelings and thoughts, is included in psychology. It's a huge research field with a lot of possibilities. Psychologists are interested in learning more about the emergent properties of brains, as well as the wide range of phenomena related to those emergent properties, and thereby join the larger neuroscientific community (Fernald, 2008: 12–15). It seeks to understand individuals and communities as a social science by defining general concepts and studying particular cases.

According to Mayer (2003: 11), a study in this area was dominated by the Freudian psychoanalysis model in the first half of the 20th century in North America, which is an extensive psychodynamic approach

- Western societies on the basis of Meyer (2003):

Table 1. Psychology in the western societies

The ancient Greeks	Hippocrates (460–377 BC) regards the brain as a place of formation of mental disorders and emphasizes the role of stressors in human life.
Romans	Galen (the 2nd century) presents a hospital as a treatment center lays the groundwork for the classification of disorders.
Crusades	The status of doctors in the social hierarchy increases along with their influence on the intellectual life; texts of ancient Greeks and Romans are found; contact with the Orient and the Middle East provides a new way of perceiving abnormal behaviors.
1347- Black Death epidemic	from this year until the end of the nineteenth century, Europe has faced the Black Death epidemic, undermining the contemporary trust in everyday human behavior's theological interpretation.
Renaissance	1500-1650 – A naturalistic explanation of emotional disorders gains greater acceptance than the belief in black magic

1879	Wilhelm Wundt, professor of physiology at the University of Leipzig, creates the first lab to conduct experimental psychology research. 1883: Emil Kraepelin compares mental disorders to a physical illness.
1891	Dr. Gottlieb Burckhard publishes the first description of psychosurgery. His technique was popularized in the thirties of the twentieth century by a Portuguese psychiatrist, Dr. Antonio Caetano Moniz (Meyer, 2003: 13).
1893	Together with Josef Breuer, Sigmund Freud publishes the first chapters of *Studies on Hysteria* and applies hypnosis to elicit free verbal associations in the patients.

- The United States on the basis of Mayer (2003)

Table 2. Psychology in the United States

Colonial period	Return to demonology and black magic
1693	Witch trials in Salem, Massachusetts
1773	The first hospital for the mentally ill in Williamsburg, Virginia, is opened. At the end of the eighteenth century: the so-called moral therapy is gaining popularity.

1812	Benjamin Rush, one of the signatories of the Declaration of Independence called the father of American psychiatry, writes the first textbook of psychiatry in the United States.
1842	Dorothy Dix and the hospital reform.
Around 1850	Thanks to the hospital reform movement, patients in psychiatric hospitals are beginning to be treated in a more humane way.
The end of the nineteenth century:	The medical model's importance in mental disorders is growing (Meyer, 2003: 14).
1892	The first meeting of the American Psychological Association takes place.
1896	Lightner Witmer organizes the first psychological clinic in the U.S. at the University of Pennsylvania.
Around 1900	Morton Prince is the first to apply the hypnosis technique in reintegration, the unification of multiple personalities. The case of Miss Beauchamp.
At the beginning of the 20th century	Interest in the Freudian model at Clark University increases in 1912
1936	Doctors James Watts and Walter Freeman conduct their first U.S. lobotomy, a type of psychosurgery (Meyer, 2003: 15).
1952	The American Psychiatric Association publishes the first editions of the

	Diagnostic and Statistical Manual of mental disorders according to which the diseases and mental disorders are classified.

The study of the human brain is of interest to psychologists. The advancement in mental illness studies has been driven by theoretical positions. Ancient cultures such as Egypt, Greece, China, India, and Persia all studied psychology. The Ebers Papyrus from Ancient Egypt described depression and mental disorders (Okasha, 2005, 116–25). Greek philosophers such as Thales, Plato, and Aristotle (especially in his De Anima treatise) discussed the workings of the mind, according to historians. Hippocrates, a Greek physician who lived in the 4th century BC, believed that mental illnesses were caused by physical rather than spiritual causes (Brink, 2008: 9). In the first half of the twentieth century, the Freudian psychoanalysis model, which is a comprehensive psychodynamic technique, dominated research in this field in North America. (Moore et.al 1968: 78). Psychoanalysis is a method of studying the mind and analyzing experience, as well as a systematized collection of theories about human behavior and a type of psychotherapy used to treat psychological or emotional distress, especially conflict that arises from the unconscious mind.

Nowadays, cognitivism, behaviorism, and depth psychology are three main theoretical paradigms of modern psychology, both of which continue long-standing philosophical traditions (Sperry, 1993). Human beings are logical, conscious, reflexive, and self-organizing, according to cognitivism, a rational philosophy tradition.

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1.3 Neurology

Neurology is a field of medicine dealing with the diseases of the nervous system. As neurology and psychiatry are related fields, however, these terms are not synonyms. Neurology deals mainly with diseases that underlie the process that damages the nervous system, and psychiatry, in turn, deals mainly with diseases that underlie the biochemical disorder of the functioning of the brain as a whole. It is worth noting that neurology began to develop in a more significant way in the Renaissance, but it was only in the 19th century that there was a surge in medical knowledge, including in the field of the function of the nervous system, which led to the separation of neurology from the internal medicine (Ginsberg, 2011: 5–9). Thanks to the separation, clinicians could adequately establish the diseases and be more accurate while defining diseases connected to language disorders.

All medicine fields are related; for instance, brain damage can cause imperfect speech, described more precisely in the thesis. The boundaries between different subspecialties are often relatively imprecise. Given these arguments, neurology is likely closer to the internal medicine than any other specialty (Biller, 2008: 1). Moreover, the field of neurology is vast, complex, and rapidly expanding. It is worth to present the role of a neurologist. A neurologist is a doctor who specializes in neurological problems and is educated to research, diagnose, and treat them. Clinical research may also include neurologists. While neurology is a non-surgical discipline, neurosurgery is its surgical counterpart (Martin, 2002: 697–704). Whereas many individuals presume that mental diseases are neurological problems affecting the central nervous system, psychiatrists have historically categorized and treated them independently (Martin, 2002: 697–704). Language impairments, post-stroke depression, dementia associated with Parkinson's disease, and cognitive dysfunctions in Alzheimer's disease are all examples of neurological diseases that have mental symptoms. As a result, it's not always easy to tell the difference between neurology and psychiatry.

When it comes to the great discoveries in neurology and neurosurgery, it is worth mentioning that wars were undeniable factors in the advances in knowledge within neurosciences. This statement can be easily supported with evidence, because many people with neurological injuries of many different types sustained during wars needed to be cured, and as a result, groundbreaking things related to the human brain have been discovered (Tatu and Bogousslavsky, 2016: 7). In antiquity, warriors tended to focus on striking the enemies' heads to defeat them. The head's importance was symbolic since ancient people did not yet know the value of its content, as the mental functions were assumed to be located in the heart. Interestingly, the first written evidence of brain injuries was documented 5,000 years ago on Egyptian papyri (Tatu and Bogousslavsky, 2016: 2). The Edwin Smith Surgical Papyrus contributes to understanding the history of the treatment of brain injuries.

War is a negative term; however, discoveries made in the ancient times and during the second world war had a significant impact on the modern medicine, especially related to the brain. Whereas, the study of the psychological aspects of language is strongly connected to charismatic leaders, often during war. The psychological and linguistic aspects are to these days used during elections by politicians. The study of psycholinguistics covers the psychological factors that enable humans to use and understand language.

1.4 Psycholinguistics

The term psycholinguistics appears to have first been used to refer to the psychology of language. However, psycholinguistics' birth as a discipline is often linked to a Cornell University seminar in 1951 (Warren, 2013: 6). The field's interdisciplinary nature is reflected in the fact that this seminar was reported in both a psychological journal and a linguistic one.

Psycholinguistics is continued to be taught in both of these disciplinary areas and is influenced by research and teaching practices and methodologies (Warren, 2013: 6). Although some of our knowledge in this field comes from introspection and daily behavior observation, most of the significant insights have come through the generation and testing of hypotheses through experiments (Warren, 2013: 6). Experimental methods are performed thanks to the software that allows a high level of control over the presentation of stimuli and collation of data, with precise timing (Warren, 2013: 7). Typically, experimental techniques involve some measurements of the response time, where participants take the time to carry out some language-related task recorded, often their accuracy in that task is also measured.

It is becoming increasingly usual to find studies that include monitoring of blood flow patterns and electrical activity associated with neural stimulation in the brain while a participant carries out some language production or comprehension task. These measures have a clear advantage over behavioral methods, such as a response button pressing, since they provide a more direct measure of psycholinguistic processing (Warren, 2013: 9). Interestingly, speakers can monitor their speech and correct it as they go, meaning that an editing process occurs during speech production (Warren, 2013: 79). However, the nature of the speech editor has been an issue of some debate. It is a mechanism geared toward self-monitoring and self-editing of the speaker's output (Warren, 2013: 79). The core symptoms of most severe mental disorders are present in culturally diverse individuals. However, there are cultural differences in how these symptoms present in clinical

settings and in their meanings. In many cultures, the effects of a psychiatric disorder are ascribed to witchcraft.

However, Jean Piaget [1896–1980] supposed that the period of the so-called concrete operations in thought structures development does not begin until the child is approximately 7-8 years old. This stage, which lasts until the child eleven years old, is then followed by the period of formal operations. Piaget's colleagues and students at his Geneva institute were the first to explore how reliable the age marking was for transferring from the preoperational to the concrete operations period. In general, their systematic learning experiments with groups of children confirmed this element of Piaget's theory (Perrucci, [2014] 2017: 1). Jean Piaget observed that children's cognitive skills progress through a series of stages. Typically, children learn the intellectual skills valued by their culture with parents and other people (Coon, 2005: 115). Generally, a child's understanding of the world is less abstract than that of an adult. Children use fewer generalizations, categories, and principles. Piaget was convinced that the intellect grows through a process he called assimilation and accommodation. Assimilation refers to using existing mental patterns in new situations.

Piaget's theory is a valuable road map for understanding how children think. However, he gave too little credit to the effects of learning (Coon, 2005: 117). Piaget greatly underestimated the mental abilities of infants. He believed that infants under the age of 1 could not think. It turns out that babies, like adults, act surprised when they see something "impossible" or unexpected. Psychologist Renee Baillargeon (1991) puts a magic show for infants where impossible events with toys occur. Some 3-months-old infants act surprised and gaze (Coon, 2005: 118). One of the greatest psycholinguists, Noam Chomsky, believed that every human mind is very complex, and due to their inborn knowledge, people can acquire languages. O'Grady (2001: 439) presents Chomsky's basic argument supporting the Universal Grammar and Innateness Hypothesis, which says that children are born with all the knowledge of the type of categories, operations that are found in the grammar of any language. This set of inborn categories is common to all human languages, and makes up the Universal Grammar. In the opinion of

Noam Chomsky (1986 cited in Crain 1999: 16–17), grammar must be inborn as it is too complicated and too abstract to be learned.

Therefore, it is unreasonable to suppose that a child can be exposed to all possible ambiguous and structural sentences during childhood. All this implies that basic thinking processes are implemented even by infants. As psycholinguistics deals with that area of study, another science – neurolinguistics deals with the issue of language representation in the human brain, that is, how and where the brain stores knowledge about the language (or languages) people use and the processes that occur in the brain when we acquire knowledge of the language and use it in everyday life.

1.5 Neurolinguistics

Neurolinguistics is a science on the border of linguistics, psychology, and neurology, studying nervous mechanisms within the human brain that control linguistic activity and speech changes due to local disturbances in the brain's work. Neurolinguistics tries to reconstruct the relationship between speech and aspects of brain functioning based on various disorders such as aphasia, stuttering, or dysarthria (Zubicaray and Schiller, 2019: 9). Neurolinguistics covers approximately the same range of topics as psycholinguistics does, i.e., all aspects of language processing, but it is considered from different scientific perspectives and methodologies. Due to its multidisciplinary nature, neurolinguistics draws its methodology and theory from many other scientific fields such as neurobiology (neuroscience), linguistics, cognitive science, neuropsychology, and computer science. Many neurolinguistic analyses are based on psycholinguistics and general linguistics, focusing on examining mechanisms that enable the brain to carry out the processes that psycholinguists and general linguists believe are essential to creating and understanding statements (Mistrík, 1993: 296). Neurolinguists study physiological mechanisms by which the brain processes language-related information, as well as linguistic and psycholinguistic theories using neuroimaging, electrophysiology, and computer simulations.

It is worth noting that neurolinguistics emerged from psycholinguists' interest in the processes taking place in the brain when using language. The research on language learning processes is used by glottodidactics and methodology of foreign language learning. Psycholinguistics is a field of science on the border of psychology and linguistics dealing with the psychological basis of language functioning, i.e., how language is acquired, processed, and used by the human mind (Mistrík, 1993: 358). The essential psycholinguists were Jean Piaget [1896–1980], Burrhus Frederic Skinner [1904–1990] (whose behavioral theory revolutionized the perceptions of language acquisition and the perception of the phases of speech acquisition), and nowadays Noam Chomsky (Levelt, 2013). Chomsky reintroduced the concept of mental representations to the study of language as part of his argument. He also made an essential distinction between people's understanding of language, which he termed "competence," and their use of language, which he called "performance," akin to Ferdinand de Saussure's distinction between langue and parole, which he drew about 60 years earlier (Cowles, 2011: 16). Chomsky has had a significant impact on current linguistics and psycholinguistics, and his emphasis on competence (rather than performance) has steered linguistics in this direction. Psychology, on the other hand, remained fascinated by the notion of language performance (Cowles, 2011: 16). Nonetheless, in the 1960s, psychologists experimented with Chomsky's theories regarding the nature of syntactic structure and his work on transformation grammar to determine if the hypothesized language processes were also psychological processes.

However, taking into consideration the brain's neurological aspects and its connection to language, the most crucial researchers were Paul Broca [1824–1880] and Carl Wernicke [1848–1905]. Their study on aphasia is considered the beginning of neurolinguistics (Zubicaray and Schiller, 2019: 19–20). Broca noticed that even though a patient's brain was very broadly harmed, the damage seemed to be located in the inferior frontal gyrus of the left frontal lobe, directing him to hypothesize that this brain region is responsible for the capacity to speak aloud (Zubicaray and Schiller, 2019: 19–20). Broca's statement generated

significant interest, and numerous similar cases have been described. A few years after his first case, Broca discovered that virtually all reported aphasia cases involved damage to the left hemisphere, almost all involved a concomitant paralysis of the right hand, and aphasia rarely occurred after damage to the right hemisphere. From these observations, Broca concluded that language must be localized in the left hemisphere, describing what has been since then referred to as Broca's Aphasia ([Broca, 1865] in Zubicaray and Schiller, 2019: 19–20). Ten years later, Carl Wernicke, a young German physician, reported two patients with damage to the posterior superior temporal lobe and deficits in language comprehension, suggesting that there was not a single language area but multiple language areas with distinct functions (Zubicaray and Schiller, 2019: 19–20). Wernicke created an exceptionally prescient theory of language's neural organization presenting what has since then been referred to as Wernicke's aphasia.

In the mid-1970s, it was popular to argue that the significant division between lexical and rule-governed aspects of linguistic competence (a fundamental division in the linguist's 'anatomy of language') is reflected in the significant symptom clusters of Broca's and Wernicke's aphasia. Certainly, agrammatism is a prominent feature of Broca's aphasia, and the fluent speech of Wernicke's aphasics is conspicuous for its lack of lexical content (Ingram, 2002: 65). At the time, psycholinguistic experimenters had just discovered what was to be hard evidence for a specific deficit in syntactic processing in Broca's aphasia, which blocked the comprehension of semantically reversible sentences containing critical syntactic cues (Ingram, 2002: 65). Broca's area is associated with speech production, and Wernicke's area with the auditory comprehension of speech sounds. This is partly due to the constellation of impairments that appear in either the production or comprehension of language (or indeed both) when patients suffer from brain damage in these particular areas (Cowles, 2011: 95). In many ways, Wernicke's aphasia is the opposite of Broca's — patients with this aphasia speak fluently and have no trouble with function words. However, the speech's content is often not meaningful and may contain word-like strings of sounds that are not

words. Alternatively, they may produce novel ways to refer to things, such as calling an egg “hen-fruit” (Cowles, 2011: 96). In terms of comprehension, patients often show clear signs of auditory comprehension difficulties, and they commonly have visible difficulties repeating spoken words.

In essence, neurolinguistics includes almost the same range of topics as psycholinguistics does, i.e., all aspects of language processing; however, it is considered from different scientific perspectives and methodologies. While psycholinguistics is the study of the interrelation between linguistic and psychological aspects, neurolinguistics studies the neural mechanisms in the human brain that control the comprehension, production, and acquisition of language. The origins of neurolinguistics can be found in the research on aphasia conducted by Carl Wernicke and Paul Broca. Nonetheless, Wernicke’s students and successors continued and creatively developed their master’s projects within this area before the Second World War at the Universität Breslau.

1.6 Chapter conclusions

The required components of the research, such as linguistics, psychology, neurology, and psycholinguistics, are covered to help understand the role and significance of neurolinguistics better.

Table 3. Contemporary brain sciences

Field	**Definition**
Linguistics	A field of science that studies language from the perspective of its units, structure, function, and development. Linguistics includes an analysis of the sense of language structure, language content, and language, and analyzes the social, cultural, historical, and political factors influencing language.
Psychology	A science that studies the mechanisms and laws governing the psyche and human behavior. Psychology also studies the influence of mental phenomena on interpersonal interactions and the interaction with the environment. The sciences on which psychology draws are mainly sociology, anthropology, philosophy, and biology. Thanks to the development of its experimental methods, psychology is an independent science. However, psychology is sometimes included in

	the social sciences and also in the humanities. It is also included in the behavioral sciences and sociology, ethology, behavioral biology, cultural anthropology, criminology, and some medicine branches (psychiatry, behavioral medicine).
Neurology	A field of medicine dealing with diseases of the peripheral nervous system and the central nervous system. Neurology and psychiatry are related fields, and some diseases are the domain of both the neurologist and the psychiatrist.
Psycholinguistics	Psycholinguistics is a field of science on the border of psychology and linguistics dealing with the psychological foundations of language functioning, i.e., how language is assimilated, processed, and used by the human mind.
Neurolinguistics	Neurolinguistics studies the neural mechanisms in the human brain that control the comprehension, production, and acquisition of language.

Neurolinguistics' evolution has had a substantial impact on these disciplines. The founders of the studies are presented, and their related findings are discussed. Without studying linguistics, it is impossible for individuals to grasp how languages function and how particular words construct beliefs. Nevertheless, in some situations, a person's mind does not function properly; therefore, psychology's importance is discussed for that reason. Thanks to psychology, people can understand how the human mind works, including how words are used.

The primary dependency of a properly working mind is on a healthy, well-developed brain. Many neurological diseases, examined by neurology, affect human speech and languages. However, psycholinguistics studies the associations, such as learning a language, between psychological processes and linguistic behavior. Nevertheless, these studies are combined with neurolinguistics, the dissertation's central theme. Neurolinguistics is a science that studies the neural mechanisms inside the human brain that, at the frontiers of linguistics, psychology, and neurology, influence language function and speech changes in disabled brains. Nonetheless, the fundamental aim of neurolinguistics is to construct a model of the relationship between speech and aspects of brain functioning.

Although distinguishing language and culture is possible, the implications of doing so must be considered. It is worth noting that language usage is influenced by both language structures and cultural values; therefore, there is no argument that language and culture are unrelated. By definition, language is a human-only characteristic. As a result of their thoughts and understanding, people have created imagination, which is a part of human nature. Human complexity is explained by the inherited determination of a subset of physical propertiesA language can be both creative and destructive; however, the most important element is the message. In social contexts, language can be beneficial, but it can also be negative and ambiguous. In order to send messages consciously, people must be able to use speech effectively. The communicative task must be performed by both the sender and the receiver while they are in a communicational situation. However, the most pressing issue concerning scientific progress today is that almost all we know about the human mind and brain is based on studies performed mostly by English-

speaking university students. It means that all understanding of the human mind is extremely restricted and skewed; as a result, people who speak different languages will provide more linguistic input. From a psychological standpoint, a person's mind is determined by the language they speak.

Psychologists are fascinated by the human brain and want to learn more about it. The area of mental disorder study has progressed due to theoretical roles. During the first half of the twentieth century, the Freudian psychoanalysis model, which is a formal psychodynamic approach, dominated research in this field in North America. All fields of medicine are intertwined; for example, brain injury can lead to stuttering, which is detailed in the thesis. The lines between different subspecialties are often blurred. Given these assertions, neurology, rather than any other specialty, is more likely to be linked to internal medicine. Neurology is also a broad, complex, and rapidly growing field. It is necessary to address the role of a neurologist. A neurologist is a specialist in neurological disorders who is trained to investigate, diagnose, and treat them. Neurologists can be involved in clinical trials. Neurosurgery is the medical equivalent to neurology, which is a non-surgical specialty. While the word "war" has a negative connotation, discoveries made in ancient times and during Second World War have had a significant impact on modern medicine, especially in the field of brain research. On the other hand, the study of psychological aspects of language is strongly linked to charismatic leaders, especially during times of war. During elections, politicians are increasingly dependent on psychological and linguistic variables. The study of the psychological factors that allow people to use and understand language is known as psycholinguistics. The field of language psychology seems to have given birth to the philosophy of psycholinguistics. However, psycholinguistics as a discipline is mostly attributed to a Cornell University seminar held in 1951. The interdisciplinary nature of the field is reflected in the fact that this seminar was presented in both a psychological and a linguistic journal. Neurolinguistics covers almost the same ground as psycholinguistics, namely, all facets of language processing; however, it does so from a variety of theoretical viewpoints and methodologies. Neurolinguistics studies the neural processes in the human brain

that regulate the comprehension, development, and acquisition of language, while psycholinguistics studies the interrelationship between linguistic and psychological aspects. Carl Wernicke and Paul Broca's work on aphasia are the foundations of neurolinguistics. can be traced back to Carl Wernicke and Paul Broca's studies on aphasia. Nonetheless, before the Second World War, Wernicke's students and successors at the Universität Breslau continued and creatively created their master's projects in this sector.

2 Carl Wernicke and the origin of neurolinguistics[1]

The exploration of the origins and dynamics of neurolinguistics' development is highly connected with the dominant figure of Carl Wernicke, a pioneer in this study area. It is worth mentioning that neurolinguistics' origins and the research conducted by other German scientists before the Second World War took place at the Universität Breslau. As mentioned before, the dominant figure in these studies was professor Carl Wernicke, whose students continued and creatively developed their master's projects within this area. The enormous part of the research was conducted at the Universität Breslau in today's Wrocław.

Traces of Carl Wernicke, the Breslau school, and the history of aphasia can be found globally in periodicals, articles, and books available in libraries in many locations. Many original texts may be found in Wrocław (Breslau), Berlin, and Frankfurt am Main. One group of source texts is now available at the University of Wrocław's library. The origins of psychiatry are associated with the medical faculty of the University of Wrocław. In 1836, Henrich Neumann initiated academic lectures on psychiatry. Carl Wernicke - Neumann's successor created the famous school "Breslauer Psychiatrische Schule" (Kiejna, 2011: 11). Its representatives became an inherent part of the history of medicine; therefore, Wrocław can now be classified as one of the vital centers of research on diseases of the nervous system in Europe. Nonetheless, Breslau and its representatives were strongly connected with other cities and institutions, such as Charité Institute in Berlin or Frankfurt University, where significant discoveries on language and the brain took place.

[1] Fragments of this chapter used in an article titled *Wrocław as the Leading Neurolinguistics Center at the Turn of the 19th and 20th Centuries.* Academic Journal of Modern Philology, in print.

2.1 Academic neurolinguistics in Breslau

The University of Wrocław (in Polish: *Uniwersytet Wrocławski*; in Latin *Universitas Wratislaviensis*) was founded in 1702 as a Jesuit college (Bobowski, 2004: 471–485). Nonetheless, the breakthrough regarding studies on the brain and language came in 1876 when the formal University Psychiatric Clinic was established, although there were no lecture halls, for which the rooms at the All Saint's Hospital were used. Neumann obtained habilitation and professorship in psychiatry as academic psychiatry was already found in Breslau as an independent field. Another figure of Breslau's psychiatry was Carl Wernicke – a professor of psychiatry and neurology, who, in 1885, became the director of the clinic (Kiejna, 2011: 19–20). At the turn of the 19th and 20th centuries, Breslau was an intensively developing center. Wernicke fought for an independent university clinic, which was finally established under Bonhoeffer.

The German university - the *Universität Breslau* was dissolved in 1945, and a Polish university was founded in 1946. Breslau, now known as Wrocław, became part of the Republic of Poland. The first Polish team of academics arrived in Wrocław in late May 1945 and took custody of the university buildings destroyed in 70% (Iłowiecki, 1981: 241). Unfortunately, parts of the university's library collection were lost during the Red Army's advance in 1945 (Richards, 2015: 30). The University of Wrocław[2] has facilities located practically all over Wrocław. Its oldest and essential part is a campus located in the Old Town, which dates back to the 18th-century Leopoldine Academy. Other facilities are located south of the *Wrocław Główny* railway station, now housing the Faculty of Historical and Pedagogical Sciences institutes, and previously belonging to the Gymnasium of St. Mary Magdalene. After the political changes in Poland in the 1990s, the university took over the post-military facilities on Koszarowa Street, where the Faculty of Social Sciences campus was established.

[2] University of Wrocław – Departments. Retrieved from https://uni.wroc.pl/wydzialy-2/Accessed 10.11.2020.

Figure 1. The entrance to the University of Breslau and the view of the Breslau University at the Oder.

Source: Bonhoeffer, Karl (1990*) Leben und Werk eines Deutschen Psychiaters und Neurologen in seiner Zeit*. No page number. Location: Central Library - *Universitätsbibliothek* Frankfurt.

2.1.1 Background – Life in Breslau

Wrocław is one of the fastest growing cities in Europe. The Silesian capital has repeatedly changed its political and cultural connections. A variety of experiences shaped Central Europe that is a rich mix of nationalities and cultures including the presence of both the Nazis[3] and the Stalinists. As there is still a rivalry between two competing visions: "the German city of Breslau" and "Polish *Wrocław*", the city was called the microcosm of Central Europe (Norman Davis and Roger Moorhouse, 2002). The term microcosm is in fact very accurate as historical events contributed to the way it is seen now: as a multicultural and multilingual city that has much to offer. The book opens with a look back at the German siege of Breslau and its eventual fall at the conclusion of Second World War. While the surviving Germans slowly flee, the invading Red Army razes several of the city's streets. The dire condition of people, aggravated by bombing, minus 20°C weather, and food shortages, deteriorates even more when revenge-seeking Soviet military officials unleash mass killing, rape, and thievery. The first chapter of the book depicts an ancient island town in the Oder whose residents traded amber and salt. The ensuing eras are covered in depth in the chapters Wrotizla, Vretslav, Presslaw, Breslau, and Wrocław. Natural occurrences and events portrayed by historians include pandemics, pogroms, Mongol invasions, the Hussite Wars, Reformation battles, the Thirty Years' War, Prussian expansionism, Napoleonic Wars, Nazism, and Stalinism. The fundamental idea of the book is to see Wrocaw's past as a microcosm of central Europe's larger history. To this aim, it is recommended that the city possess a collection of historical landmarks that are distinct from the historical experience of the region. Multi-ethnic settlement, the presence of a Jewish minority, the rise of dynasty rather than national polities in the pre-modern period, and twentieth-century exposure to both Nazism and Soviet Communism are all characteristics.

[3] It is worth noting that at that time the anti-Semitic views were originated in Germany and Breslau as well. The publication *Word and actions: rethinking the Social History of German Antisemitism, Breslau,* 1870–1914 (Till van Rahden) describes the time when Carl Wernicke lived in Breslau.

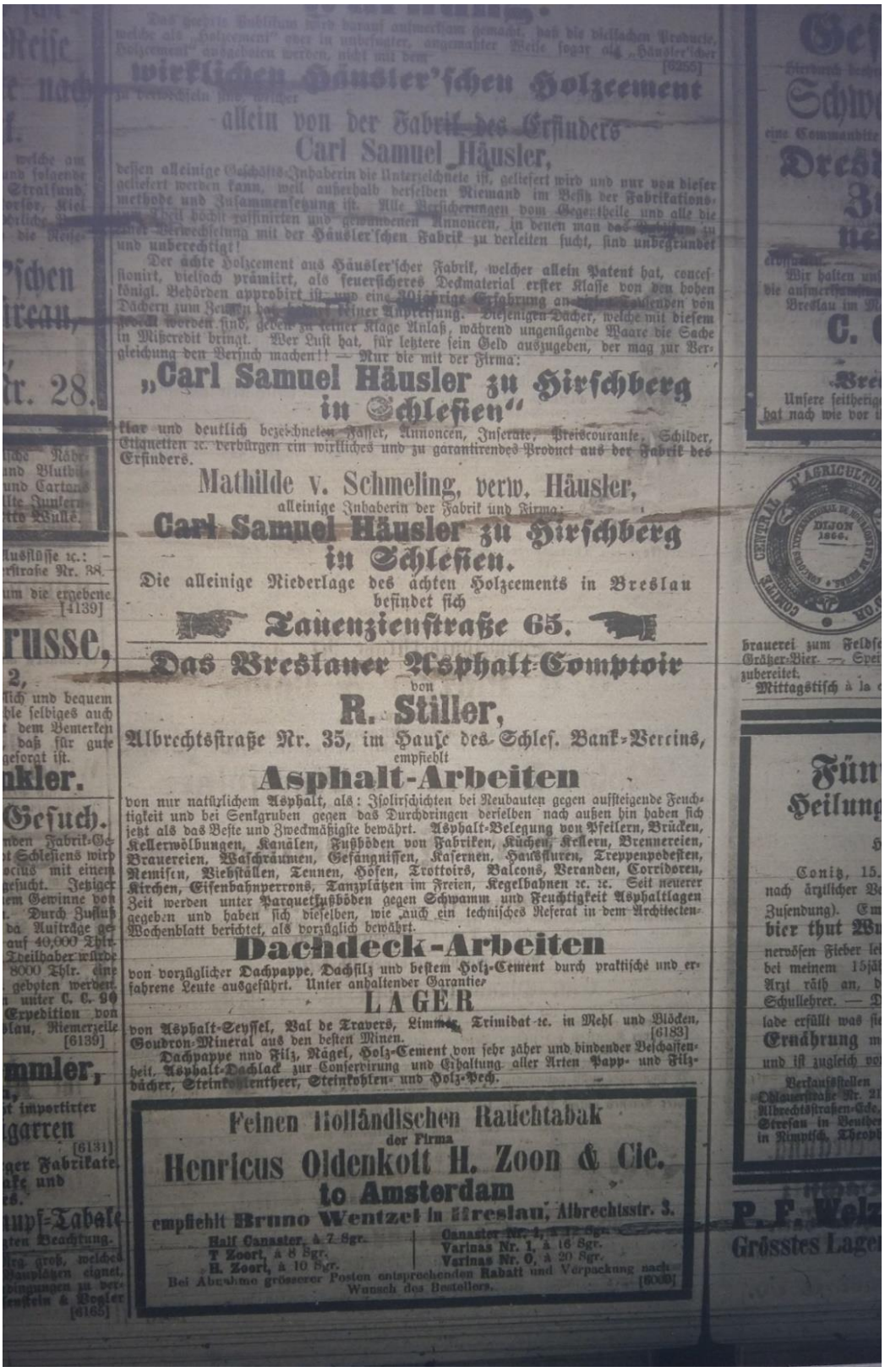
Nonetheless, Breslau in year 1870, the time when Carl Wernicke earned his medical degree, was full of cultural events, especially, there were festivals and circuses organized often in the town center. That can now be evoked thanks to the *Breslauer Zeitung* (1870) in which all events that happened on a particular day were precisely described. The below presented pictures show what the paper looked like, and what type of information was printed in it. It is worth noting that there were several editions a day of that paper; which means that people were interested in many fields of social life, science and mostly politics.

Figure 2. Breslauer Zeitung, 1870.

Source: Wrocław University Library. An example of *Breslauer Zeitung*. Page: 2281. Photography by A. Daniel 05.10.2018.

Figure 3. Breslauer Zeitung, 1870.

Source: Wrocław University Library. An example of *Breslauer Zeitung*. No page number. Photography by A. Daniel 05.10.2018



wirklichen Häusler'schen Holzcement

allein von der Fabrik des Erfinders

Carl Samuel Häusler,

„Carl Samuel Häusler zu Hirschberg in Schlesien"

Mathilde v. Schmeling, verw. Häusler,

alleinige Inhaberin der Fabrik und Firma:

Carl Samuel Häusler zu Hirschberg in Schlesien.

Die alleinige Niederlage des ächten Holzcements in Breslau befindet sich

Tauenzienstraße 65.

Das Breslauer Asphalt-Comptoir

von

R. Stiller,

Albrechtsstraße Nr. 35, im Hause des Schles. Bank-Vereins,

empfiehlt

Asphalt-Arbeiten

Dachdeck-Arbeiten

LAGER

Feinen Holländischen Rauchtabak

der Firma

Henricus Oldenkott H. Zoon & Cie.

to Amsterdam

empfiehlt Bruno Wentzel in Breslau, Albrechtsstr. 3.

Half Canaster, à 7 Sgr.
T Zoort, à 8 Sgr.
H. Zoort, à 10 Sgr.
Canaster Nr. 1, à 16 Sgr.
Varinas Nr. 1, à 16 Sgr.
Varinas Nr. 0, à 20 Sgr.

Bei Abnahme grösserer Posten entsprechenden Rabatt und Verpackung nach Wunsch des Bestellers.

Figure 4. Breslauer Zeitung, 1870

Source: Wrocław University Library. No page number. An example of *Breslauer Zeitung*. Photography by A. Daniel 05.10.2018.

The pages are filled with information. The font used in the *Breslauer Zeitung* is called ***Deutsche Schrift/Koch-Fraktur***; therefore, it can cause troubles with reading and finding required information. The history of Wrocław is being brought up regularly by Polish scholars, at no surprise, as it is a very interesting subject of debate. Marcin R. Odelski (2017) in his paper *Wrocław – Cultural Semantics of the Contemporary Urban Embedding* presents the transformation of Europe – and, particularly, one of its narrow scopes – a socio-urban transformation that has undergone an enormous shift. Wrocław, one may state, is a very individual city or, rather one should say, a city that is perfect for individuals. This work aims at exploring the concept of Wrocław from various possible angles within the meaning of Europe.

However, people in modern Wrocław learn to recognize not just themselves, but also the area around them. From the interior as well as the exterior, light is shone on selected meanings being built by people; as a result, one should also adhere to its citizens and tourists, because empty space loses its meaning to a significant extent. The last two decades (1989-2009) will almost certainly be remembered as a time of continual fast change. This time in Wrocławians' mindset was (and still is) filled of acts that use the "re" prefix to signify and emphasize far-reaching efforts, initiatives that go far beyond the vision of the calcified mind so prevalent in the bygone political age.

Another good example can be the article written by Uruszla Wich-Szymczak. The article *entitled Wrocław as a European Capital of Culture 2016.Brand Building on Facebook. Visual Identification.* contains research in two fields of image building. The first is describing general thoughts about city marketing communication, brand building, and current trends in this area. Nonetheless, the history of Breslau is being cherished by the local people. Citizens do not want to bury the past but rather cherish it which can be proven by the fact that one can find in local restaurants and tea places amazing books describing the

history of Wrocław from its very beginning. Such books can be found for instance in tea places[4] where people can read gripping books about the history of Wrocław. Books and documents regarding the beginning of neurolinguistics be found worldwide.

However, Carl Wernicke oftentimes is not recognized in Poland by those who are not familiar with his field of study. The scholar was the pioneer of neurolinguistics, a physician, anatomist, psychiatrist, and neuropathologist in Breslau. As he is known around the world as a pioneer of neurolinguistics, there are few people who are familiar with his life. Nonetheless, the materials that can be found in Wrocław are of a great value, especially for the future generations; therefore, some of which are presented further in the paper.

- **Archival documents found in Wrocław**

There are several works and articles that have survived in libraries in Wrocław and around the world as well, contributing to the development of neuroscience. These works present pioneer discoveries, thanks to which now all branches of neuroscience can benefit.

The works that can be found in libraries in Wrocław:

1. Lanczik, Mario, (1988) *Der Breslauer Psychiater Karl Wernicke*, Sigmaringen.
2. Wernike, Carl (1875) *Erkrankung der inneren Kapsel. Ein Beitrag zur Diagnose der Heerderkrankungen*, Breslau.
3. Wernicke, Carl (1984) *Grundriss der Psychiatrie in klinischen Vorlesungen*. Leipzig.
4. Wernicke, Carl (1887) *Fall von progressiver Muskelatrophie. Jahresbericht der schlesischen Gesellschaft für vaterländische Kultur*.

[4] Herbaciarnia, Piaskowa 17 Street , 53-110 Wrocław

5. Wernicke, Carl (1888) *Fall von progressiver Muskelatrophie. Breslauer ärztliche Zeitschrift*.

A short presentation of Wernicke's life can make one realize how his life lead to his achievements. Carl Wernicke (Kiejna, 1999) became a Doctor of Medicine in 1870; however, his Doctoral Thesis was not published until 1875[5].

Wernicke was a physician, anatomist, psychiatrist, and neuropathologist who lived in pre-war Wrocław. Wernicke's aphasia, which is often linked with Wernicke's name and referred to as Wernicke's aphasia, is a result of his significant study into aphasia. His study, together with Paul Broca's, resulted in ground-breaking discoveries on the localization of brain function, particularly speech. Wernicke was born in Tarnowitz, now Tarnowskie Gory, a small town in Upper Silesia, Prussia. He worked as an assistant at Allerheiligen Hospital in Breslau for six months after earning his medical degree at the University of Breslau (1870). He returned to the hospital after serving as an army surgeon for a while, working in the mental section under Professor Heinrich Neumann, who eventually dispatched him to Vienna for six months. (Kiejna, 1999). Wernicke served in the Franco-Prussian War in 1870 as an army surgeon. From 1876 to 1878, Wernicke worked as a first assistant under Karl Westphal in the clinic for psychiatry and nervous diseases in Berlin. Afterwards, he founded a private neuropsychiatric practice in Berlin and published numerous articles. In 1885, he served as an associate professor of neurology and psychiatry at Breslau and became the head of the University Hospital's Department of Neurology and Psychiatry (Kiejna, 1999). In 1890, he attained the chair at Breslau, later performing similar functions at the University of Halle in 1904, heading its Psychiatry and Neurology Clinic.

The formation of contemporary psychiatry took place between the second part of the nineteenth century and the beginning of the twentieth century, with its greatest accomplishments in Europe, where Wrocław was one of the most

[5] Carl Wernike (1875) *Erkrankung der inneren Kapsel. Ein Beitrag zur Diagnose der Heerderkrankungen*, Breslau.

significant scientific centers. Names such as Henrich Neumann, Carl Wernicke, Karl Bonhoeffer, and Alois Alzheimer must be mentioned – their biographies are strongly related to Wrocław's psychiatry. This applies in particular to H. Neumann and his pupil Carl Wernicke, considered to be the founder of the Wrocław school of neuropsychiatry. The scholars from Orfried Foerster, the founder of the German school of neurosurgery, Karl Heibronner, later professor of psychiatry in Utrecht or Hugo Liepmann, professor of psychiatry, and neurology in Berlin.

Professor Alzheimer's untimely death did not allow him to react to the great plans connected with the assumption of the position of director of the Clinic of Psychiatric and Nervous Diseases in Wrocław. (Klejna, Wójtowicz: 1999: 9), In Wrocław, in accordance with the times, a psychiatric hospital has been established and the municipal Hospital for the mentally ill completed in 1888 and the university Clinic of Pychiatric and Nervous Diseases completed in 1907 were one of the most modern facilities of this type in Europe (Klejna, Wójtowicz: 1999: 9). During the war, the building of the clinic was severely damaged. A lot of invaluable documentation has been destroyed (Klejna, Wójtowicz: 1999: 10). On the other hand, in the traumatic consciousness of the generation that survived the war, there was a complete rejection of the ties with the tradition of German psychiatry in Wrocław, which further blurred many important facts of historical significance.

Two aerial photographs of the Wrocław Old Town are 77 years old. Their comparison may surprise, because the city, on the one hand, is changing a lot, and on the other – it remains unchanged. The towers are signposts allowing to recognize places in the old town. Black and white photos are the work of Hansa-Luftbild employees, who in the 1920s and 1930s performed the so-called oblique aerial photographs which, in contrast to photogrammetric photographs taken automatically, are not flat, they show a spatial image. In turn, colorful panoramas were made by Stanisław Klimek, an excellent photographer over the last few years.

Figure 5. Hans-Luftbild (Gazeta Wyborcza 11th of May, 2018).

Breslau: Old Town in unique pre-war photos[6]. Source: Internet, public domain.

Figure 6. Stanislaw Klimek (Gazeta Wyborcza 11th of May, 2018).

Wrocław: Contemporary view[7]. Source: Internet, public domain.

[6] Retrieved from: https://Wrocław.wyborcza.pl/Wrocław/7,35771,23383380,breslau-z-lotu-ptaka.html?disableRedirects=true. Accessed: 22.04.2021.
[7] Retrieved from: https://Wrocław.wyborcza.pl/Wrocław/7,35771,23383380,breslau-z-lotu-ptaka.html?disableRedirects=true. Accessed: 22.04.2021.

Wrocław, thanks to its history and modern changes, is an interesting research subject. During the war, the structure of the facility was seriously harmed. Numerous significant documents have been pulverized. Then again, in the awful awareness of the people that endured the war there was a complete dismissal of the feeling of ties with the entire custom of German psychiatry in Wrocław.

2.2 Academic neurolinguistics in Berlin

Another group of source texts is available at the Charité Medical Humanities[8] (Bibliothek für Geschichte der Medizin und Soziale Medicine) in Berlin. The Library of History of Medicine and Social Medicine, "Library Medical Humanities" is a branch library of the Charité Medical Library and hosts the specialist literature of Charité Centrum. The library manages and organizes scientific work resources and supports research projects by researching and providing literature, images, and other sources. At *Thielallee* 71 in Berlin-Dahlem, the library is available to all teachers, researchers, students, and the interested public during opening hours. It is worth adding that the Medical Humanities Library is a member of the Association of Medical History and Related Libraries. The establishment of the first separate wards for neurological patients at Berlin Charité Hospital in 1865 was an important starting point for German neurology. Many vital figures have worked there, such as Carl Wernicke, who worked at the psychiatry clinic of the Charité academic hospital from 1876 to 1878, or Karl Bonhoeffer, who succeeded Theodor Ziehen [1862–1950] as a full professor of psychiatry and neurology at the University of Berlin and who was a director of the university clinic of psychiatry and neurology at the Charité Hospital.

[8] *A brief portrait of Charité – Universitätsmedizin Berlin*. Retrieved from https://www.Charité.de/en/. Accessed: 12.11.2020.

Figure 7. Institute of the History of Medicine. Campus Benjamin Franklin. Photography by A. Daniel, 27.05.2019.

Figure 8. Psychiatric and mental Charité hospital.

Source: Bonhoeffer, Karl (1990*) Leben und Werk eines Deutschen Psychiaters und Neurologen in seiner Zeit*. No page number. Location: Central Library - *Universitätsbibliothek* Frankfurt.

Figure 9. The entrance to the Charité from the Charitéstrasse.

Source: Bonhoeffer, Karl (1990) *Leben und Werk eines Deutschen Psychiaters und Neurologen in seiner Zeit*. No page number. Location: Central Library - *Universitätsbibliothek* Frankfurt.

Figure 10. A leaflet found in Charité Institute on 27.05.2019.

The lecture hall provides an ideal forum for events on current problems and the history and the future of medicine. For example, new technological and pharmacological developments, the expansion and restructuring of the healthcare system, and the changes in health care professions can be taken into consideration when it comes to research, teaching, and patient care in the Charité. Explicitly, humanities and social science perspectives should also be included. The lecture hall is a very accessible place right at the Charité area entrance, near the central station and *Invalidenstraße*. It is close to other significant buildings and institutions inside and outside the Charité: Mental Hospital and Museum of Medicine History Museum and Museum of Natural History and Hamburg-Burger / Museum of Contemporary Art.

Figure 11. On Knife's cutting. A leaflet found in Charité Institute on 27.05.2019.

The exhibition additionally displays his performances on the public stages and shows doctor Ferdinand Sauerbruch (1875–1951) as a political actor. His ambivalent attitude toward National Socialism will also be addressed.

2.3 Academic neurolinguistics in Frankfurt am Main

Another group of materials comes from the Frankfurt University Library [German: *Universitätsbibliothek* Frankfurt am Main or *Universitätsbibliothek Johann Christian Senckenberg*][9] the Goethe University of Frankfurt, Germany. It originated in the 15th century as a town library. Johann Wolfgang Goethe University in Frankfurt[10] (German Johann Wolfgang Goethe-Universität Frankfurt am Main), in short University of Frankfurt am Main (official name until 1932), the University of Frankfurt is a German university founded in 1914 in Frankfurt am Main and named in 1932 after Johann Wolfgang Goethe [1749–1832], the most famous inhabitant of this city. The first plans for a university in Frankfurt am Main were at the end of the 14th century, when the city council tried to relocate the university from Paris to Frankfurt am Main (Jung, 1915). After the destruction of Heidelberg on May 22, 1693, by French troops, the professors of Heidelberg University relocated to Frankfurt am Main and established themselves there in 1694 under the rector Johann Ludwig Fabricius [1632–1696] as a university in exile (Hautz, 1862: 228–230). They did not find permanent residence in Frankfurt am Main and was relocated to Weinheim in 1698, where the temporary residence of the Palatinate Elector Johann Wilhelm was.

In terms of psychiatry, Frankfurt am Main is associated with the Wernicke-Kleist-Leonhard school of psychiatry (Malhotra and Chakrabarti, 2015: 103). Karl Kleist [1879–1960] worked as a resident physician during Wernicke's directorship in Halle; later, he became the head of the psychiatry department in Frankfurt am Main. In 1924 he coined the term “cycloid psychosis” (Malhotra and Chakrabarti, 2015: 103). Kleist shared his clinical interests with Karl Leonhard [1904–1988], his collaborator in Frankfurt from 1936 to 1950. Furthermore, Alois Alzheimer, in 1889, started working in a psychiatric institution (Städtische Anstalt für Irre und Epileptische) in Frankfurt am Main. Moreover, Karl Heilbronner was a volunteer

[9] *About University Library Johann Christian Senckenberg.* Retrieved from https://www.ub.uni-frankfurt.de/ueber/ueber_en.html. Accessed: 14.08.2020

[10] *Niemcy. Ważniejsze szkoły wyższe* (1993), [in:] Encyklopedia PWN https://encyklopedia.pwn.pl/haslo/;446970. Accessed: 05.06.2020.

at the *Senckenberg Institute* in Frankfurt, where he completed his knowledge of anatomy.

Today, the Frankfurt University Library is one of Germany's largest academic libraries with its extensive holdings and collections; the Frankfurt am Main University Library is one of the central academic libraries in the Federal Republic of Germany. It combines a scientific library for Frankfurt and the Rhine-Main area, a university library with numerous national tasks, and a focused library within the regional supply of literature. The Frankfurt University Library is a member of the Collection of German Prints, the virtual German national library, covering years from1801 till 1870. The selected works connected to neuroscience and their titles and covers are presented in the next section.

2.4 Breslau School of Neurolinguistics

The beginnings of academic neurolinguistics in Breslau can be traced back to development of psychiatry as a medical specialty from which neurology emerged and its first representatives' scientific achievements. One of the founders of the local neuropsychiatric school was Heinrich Neumann [1814–1884]. In 1874 Neumann established a psychiatric clinic as a separate research and teaching facility at his Alma Mater in Breslau (Kiejna, 2011: 18–19). The growing needs in psychiatric care led to building a new facility located at today's Kraszewskiego Street 25. Unfortunately, Neumann's death in 1884 prevented him from seeing the construction's completion. The new institution was led by his student and successor, Carl Wernicke. As per Kiejna (2011: 24), Breslau was a modern, developing city with the proper conditions for research work. Moreover, it became an important research center as attractive buildings were erected, such as a university complex or a new modern psychiatric clinic.

Traces of Carl Wernicke, the Breslau school, and the history of aphasia can be found globally. Periodicals, articles, and books presenting the origins of neurolinguistics are available in libraries in many locations. Today, many original

texts may be found in Wrocław, Berlin, and Frankfurt am Main, as in these cities significant German scientists conducted their research. Therefore, selected materials with descriptions of the location and signatures are presented in this section to help researchers find them quickly.

2.4.1 Heinrich Neumann [1814–1884]

Figure 12. Heinrich Neumann.

Source: Kiejna, A. (1999). *Z dziejów Kliniki Psychiatrycznej i Chorób Nerwowych we Wrocławiu. Wybitni przedstawiciele i budowle.* Fundacja Ochrony Zdrowia Psychicznego, Wrocław. No page number. Location: *Biblioteka Kliniki Psychiatrycznej Akademii Medycznej in Wrocław.*

Heinrich Wilhelm Neumann was born on January 17, 1814, and died on October 10, 1884, in Wrocław. He was a German psychiatrist, a professor of psychiatry at the University of Breslau. He studied medicine at the University of Breslau and, in 1836, obtained a doctorate. In 1842 Neumann obtained his habilitation in internal medicine (Kirchhoff, 1921: 261–265). From 1846 to 1849, Neumann was an assistant at the Mentally Sick department in *Lubiąż* (in German: Irrenheilanstalt in Leubus). In 1862 Neumann obtained his habilitation in psychiatry and became an associate professor. From 1867 until he died in 1884, he was the head of the psychiatric ward of the All Saints' Hospital (in German: *Allerheiligen*-Hospital) in Breslau. Carl Wernicke was his successor.

2.4.2 Carl Wernicke [1848–1905]

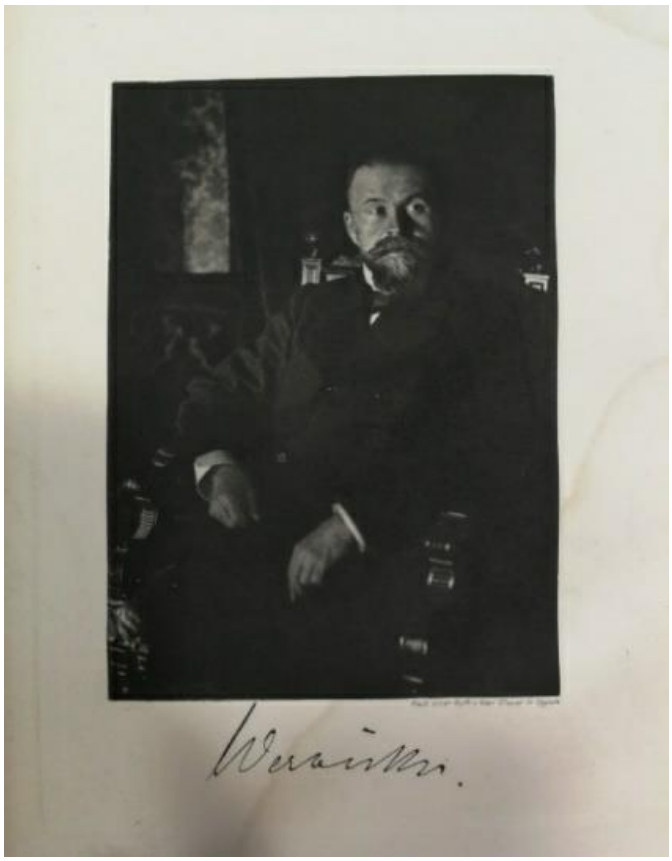


Figure 13. Wernicke, Carl (1906) Grundriss der Psychiatre.

Source: *Wernicke, Carl (1906) Grundriss der Psychiatre* Location: Charité Medical Library.p.1.

Carl Wernicke was born on May 15, 1848, in Tarnowitz, now Tarnowskie Góry. He began schooling in his hometown. As there was no gymnasium at the location, Wernicke studied at the Royal Gymnasium in Opole and then at St. Maria Magdalena's Gymnasium in Breslau. After graduating from high school, in the challenging years 1866–1870 for the Prussian state, he studied medicine at the Fryderyk Wilhelm University in Breslau (Kiejna and Wójtowicz, 1999: 9). After obtaining his doctor's diploma and doctoral promotion, Carl Wernicke briefly became involved in a professional relationship with the Breslau ophthalmologist, Professor Richard Förster [1825–1902].

However, the political situation in Europe interrupted this cooperation as the beginning of Wernicke's medical studies coincided with the Prussian-Austrian War. As a graduate of the medical faculty, Wernicke was drafted into the army; this was the first major obstacle on his difficult career path (Kiejna, 2011: 20–21). The war ended after ten months, thus the young doctor could soon resume his professional and scientific work. However, Wernicke did not return to ophthalmology and chose to work in the psychiatric ward led by Heinrich Neumann. In 1874, at the age of only 26 and working as an assistant at the All Saints' Hospital in Breslau, he published his monumental work *Der Aphasische Symptomencomplex* which brought him worldwide fame.

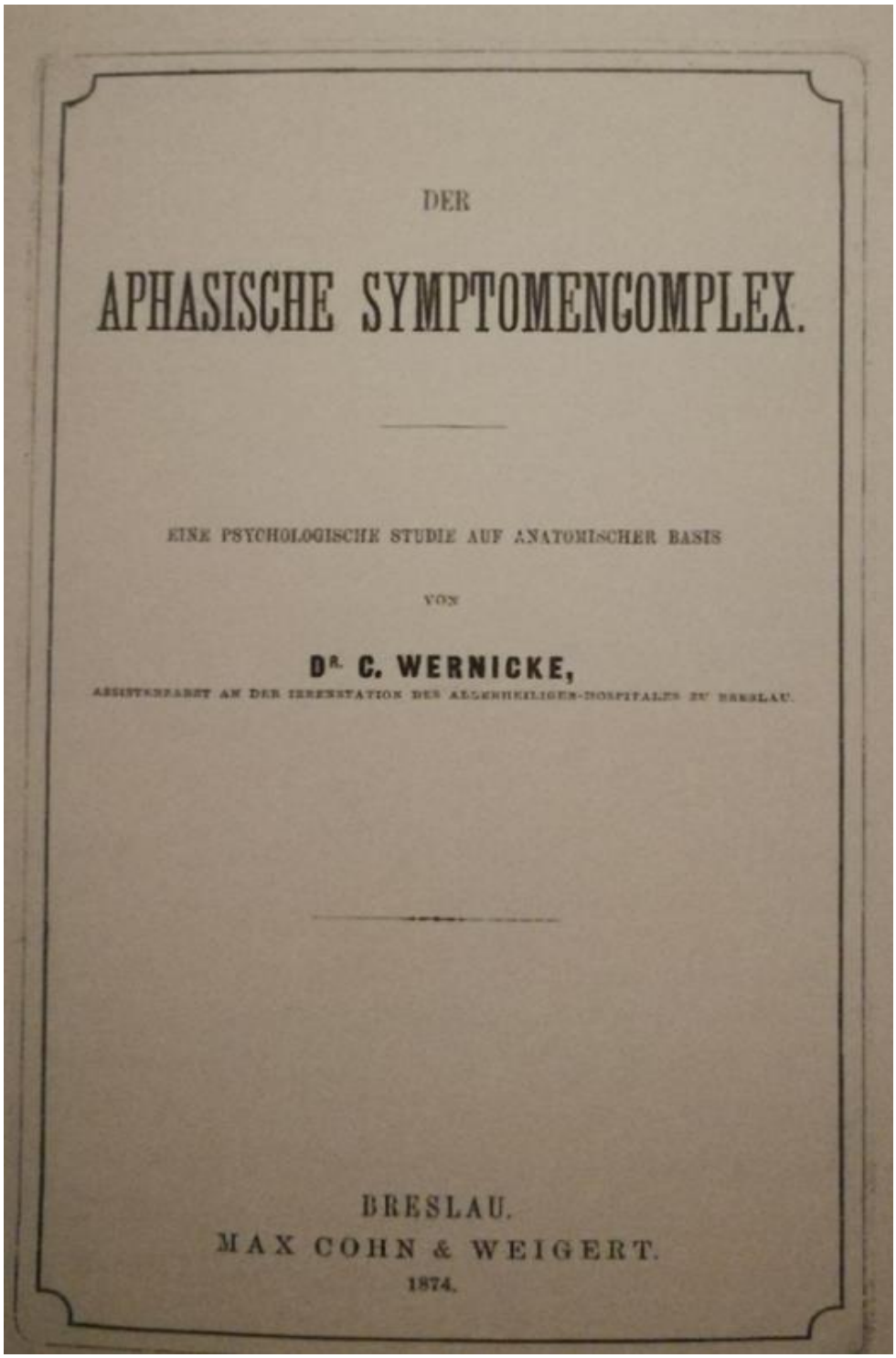


Figure 14. Wernicke, Carl (1874) Der Aphasische Symptomenkomplex, Breslau 1874.

Source: Kiejna, A. (1999). *Z dziejów Kliniki Psychiatrycznej i Chorób Nerwowych we Wrocławiu. Wybitni przedstawiciele i budowle.* Fundacja Ochrony Zdrowia Psychicznego, Wrocław. Location: Biblioteka Kliniki Psychiatrycznej Akademii Medycznej in Wrocław.

In this dissertation, Wernicke presented his observations and research on the speech center's location, its damage, and related neurological and psychiatric disorders. At that time, a young and unknown doctor located and described the speech center on the left temporal lobe's lateral surface. Thanks to Wernicke, it is possible to provide its location even more precisely - in the posterior part of the upper left temporal gyrus. The described location was given the discoverer's name and is referred to as Wernicke's area, while speech disorders caused by its damage, i.e., sensory aphasia, were also commemorated by his name (Wernicke's aphasia).

The next significant stage of Wernicke's career was work in the psychiatry clinic of the Charité academic hospital in Berlin. From 1876 to 1878, Wernicke served as a first assistant under Karl Westphal [1833 –1890] in the clinic for psychiatry and nervous diseases (Kiejna and Wójtowicz, 1999: 9). After leaving Charité in 1878, Wernicke remained in Berlin and ran a private neurological practice. He did not return to the clinic in Berlin. Therefore, after the death of the director of Breslau psychiatric clinic, Wernicke accepted the proposal to take over the facility. Wernicke's arrival in Breslau coincided with constructing a new psychiatric facility; the clinic was moved to a new facility in 1888, thus becoming an independent institution. In 1890 he attained the chair at Breslau, later performing similar functions at the University of Halle in 1904, heading its Psychiatry and Neurology Clinic (Kiejna and Wójtowicz, 1999: 9). Professor Wernicke's scientific independence resulted in the emergence of subsequent publications in which he announced the results of his explorations.

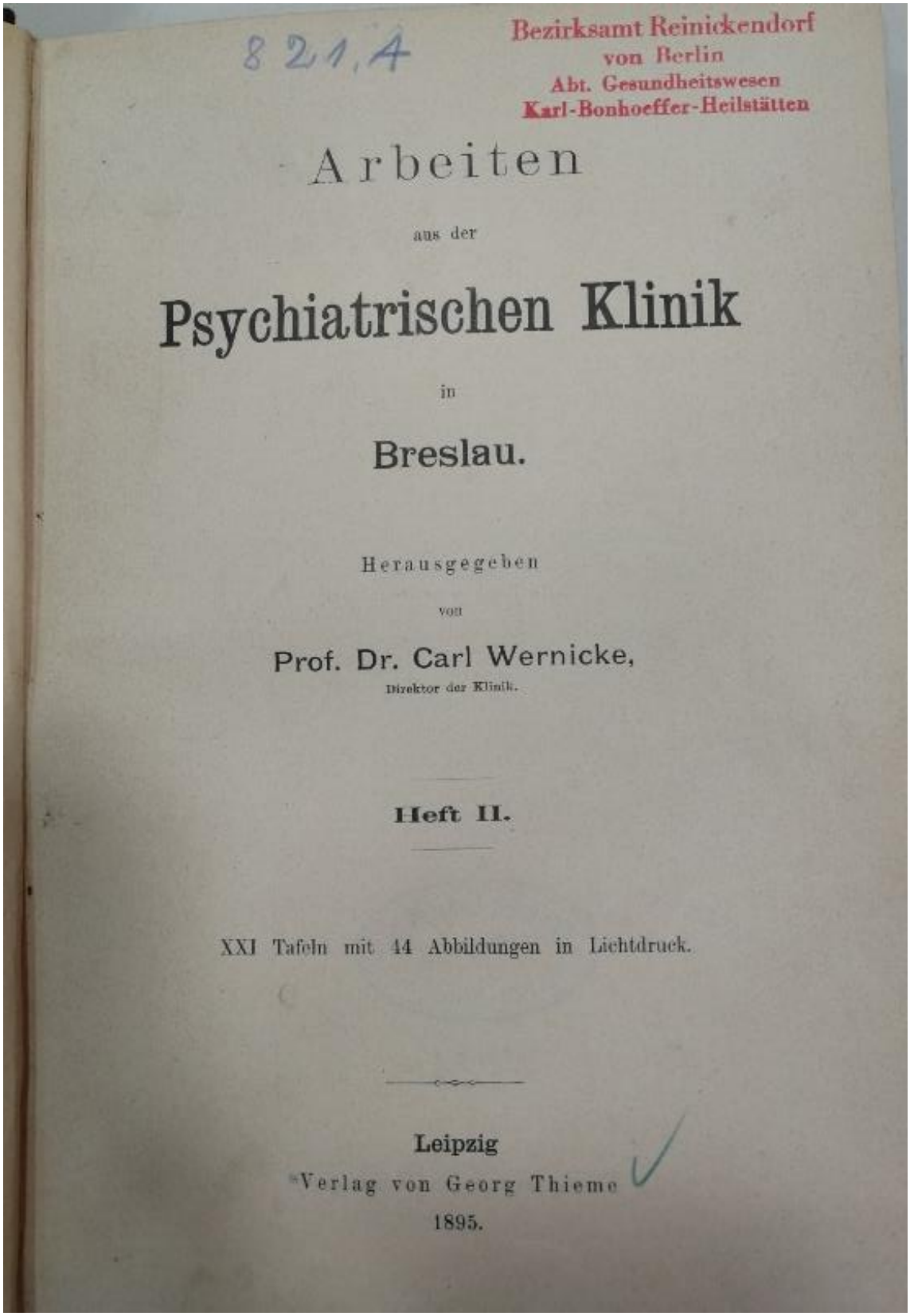


Figure 15. Arbeiten aus der Psychiatrischen Klinik in Breslau C. Wernicke.

Source: Wernicke, Carl (1895) *Arbeiten aus der Psychiatrischen Klinik*. Location: Charité Medical Library.

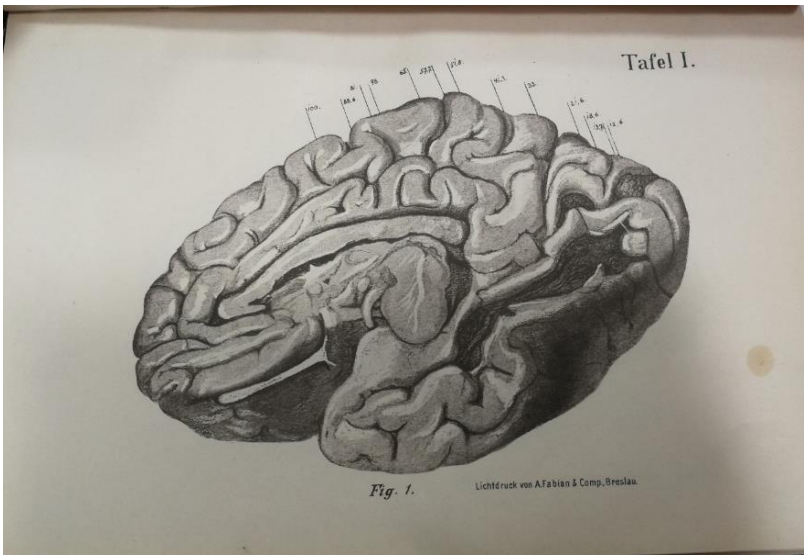


Figure 16. The right hemisphere. Source: Arbeiten aus der Psychiatrischen Klinik in Breslau C. Wernicke. Location: *Charité Medical Library.*

Source: Location: Wernicke, Carl (1895) *Arbeiten aus der Psychiatrischen Klinik*. No page number. Location: Charité Medical Library.

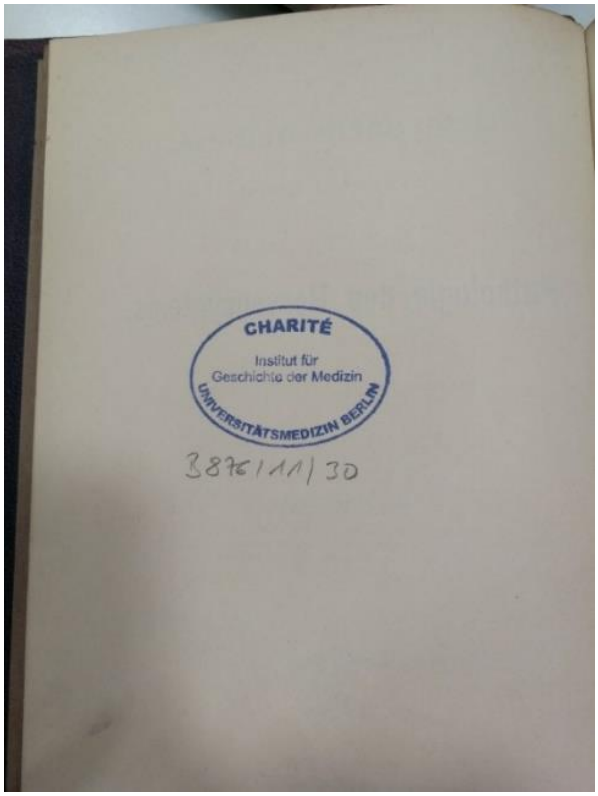


Figure 17. Wernicke Pathologie des Nerensystems.

Source: Wernicke, Carl (1893) Pathologie des Nervensystems. Location: Charité Medical Library.

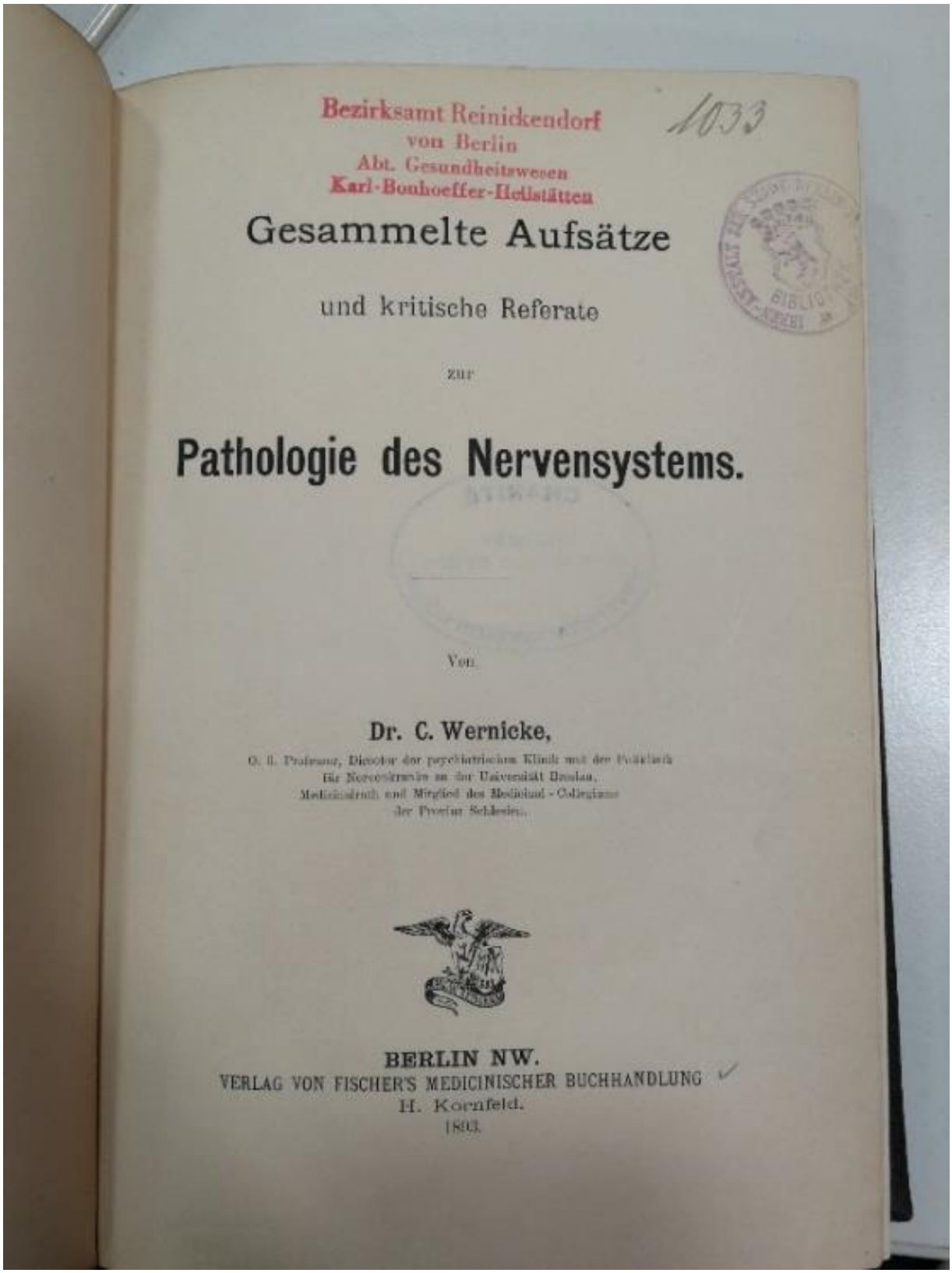


Figure 18. C. Wernicke Pathologie des Nerensystems.

Source: Wernicke, Carl (1893) *Gesammelte Aufsätze und Kritische Referate Zur Pathologie des Nervensytems*. Location: Charité Medical Library.

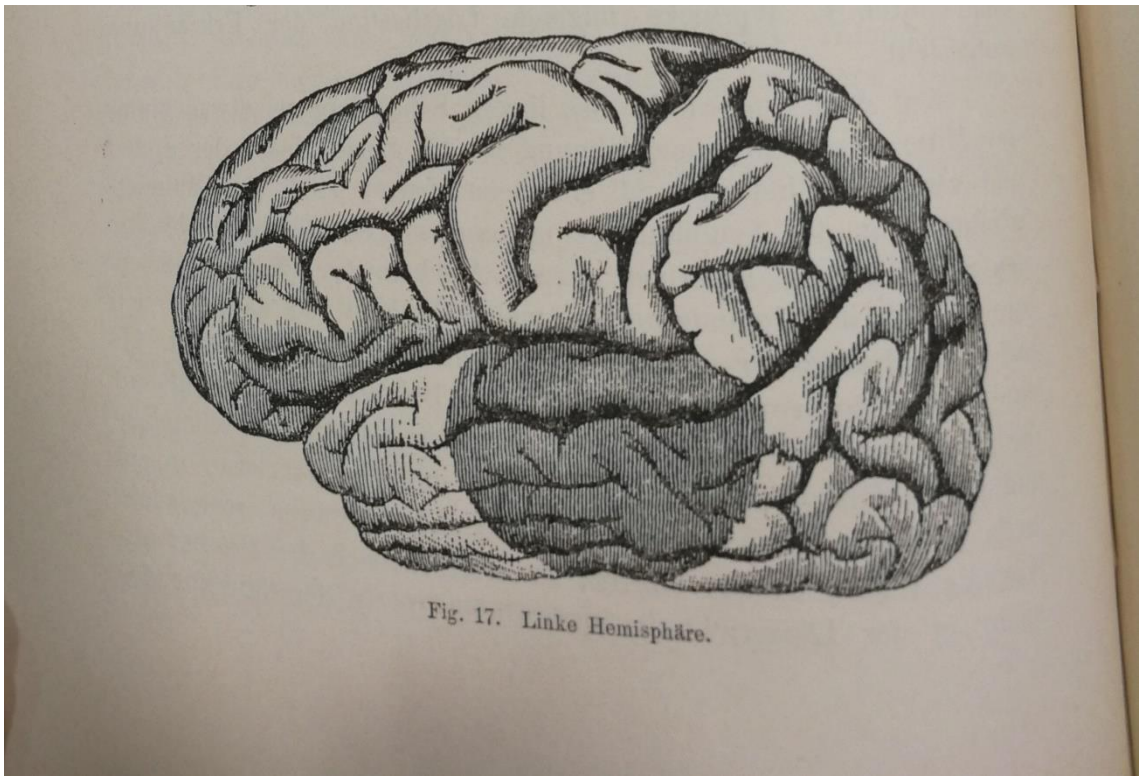


Figure 19. Figure 18. C. Wernicke Pathologie des Nerensystems.

Source: Wernicke, Carl (1893) *Gesammelte Aufsätze und Kritische Referate Zur Pathologie des Nervensytems*. Location: Charité Medical Library.p.202.

It seemed to Wernicke entirely out of the question, and equally important to the progress of science, that new knowledge is on its way, or that a false formation is shown as such, and that a hunch is removed from the way of progress. Wernicke concludes that since the repetition has always been the main factor for all truths, this time it might benefit from critical appraisals. Moreover, Wernicke (1893: 5–7) admits that the journal's publication is predominantly critical.

In 1893, a collective monograph edited by him was published, entitled *Gesammelte Aufsätze und Kritische Referate Zur Pathologie des Nervensytems* (Collected essays and critical articles on the pathology of the nervous system). Another publication published in 1906 was Grundriss der Psychiatrie's volum*e in Klinischen Vorlesungen* (An outline of psychiatry in clinical lectures).

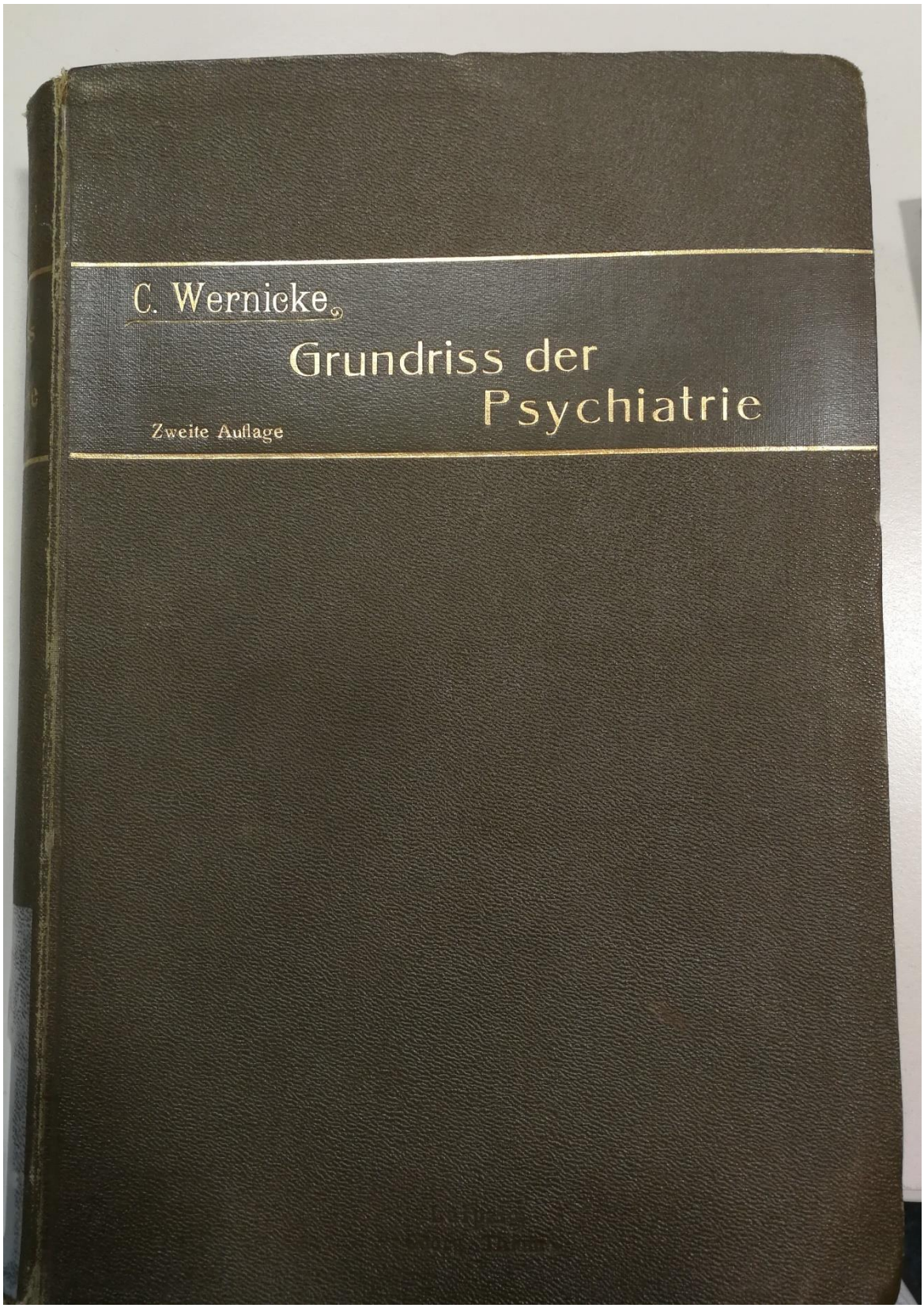


Figure 20. Wernicke, Carl (1906) Grundriss der Psychiatre.

Source: *Wernicke, Carl (1906) Grundriss der Psychiatre*. Location: Charité Medical Library.

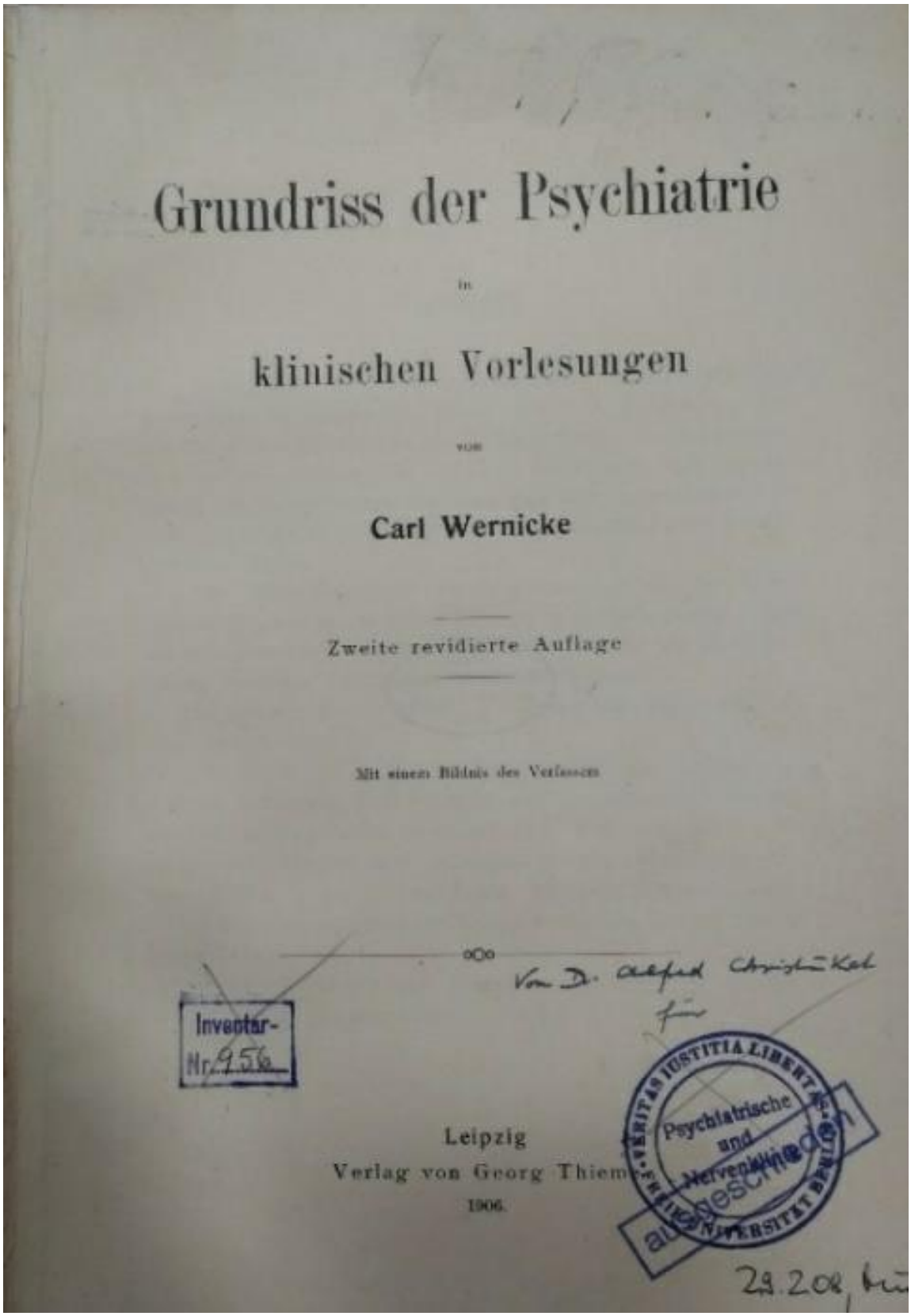
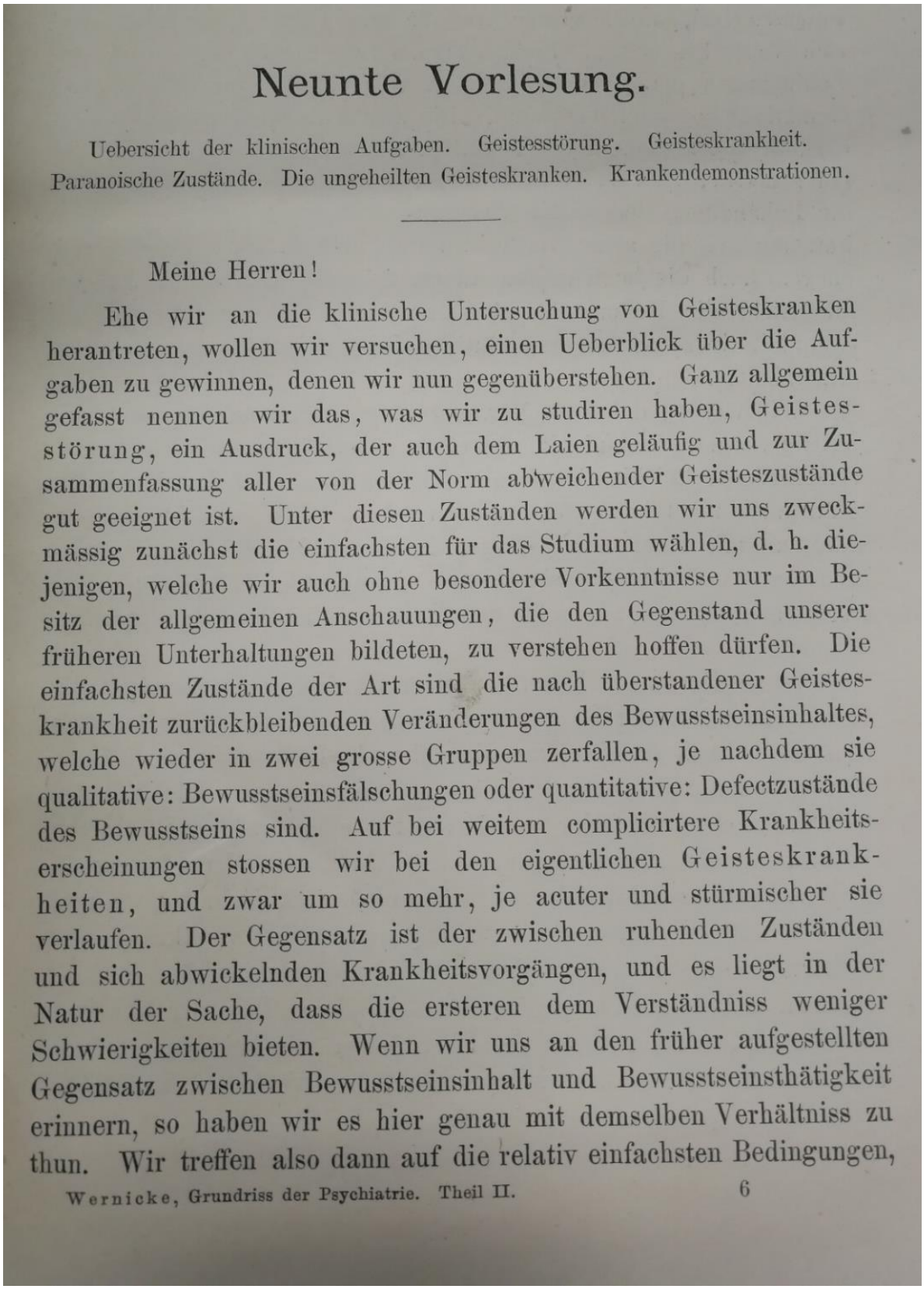


Figure 21. Wernicke, Carl (1906) Grundriss der Psychiatre.

Source: *Wernicke, Carl* (1906) *Grundriss der Psychiatre*. Location: Charité Medical Library.



Neunte Vorlesung.

Uebersicht der klinischen Aufgaben. Geistesstörung. Geisteskrankheit. Paranoische Zustände. Die ungeheilten Geisteskranken. Krankendemonstrationen.

Meine Herren!

Ehe wir an die klinische Untersuchung von Geisteskranken herantreten, wollen wir versuchen, einen Ueberblick über die Aufgaben zu gewinnen, denen wir nun gegenüberstehen. Ganz allgemein gefasst nennen wir das, was wir zu studiren haben, Geistesstörung, ein Ausdruck, der auch dem Laien geläufig und zur Zusammenfassung aller von der Norm abweichender Geisteszustände gut geeignet ist. Unter diesen Zuständen werden wir uns zweckmässig zunächst die einfachsten für das Studium wählen, d. h. diejenigen, welche wir auch ohne besondere Vorkenntnisse nur im Besitz der allgemeinen Anschauungen, die den Gegenstand unserer früheren Unterhaltungen bildeten, zu verstehen hoffen dürfen. Die einfachsten Zustände der Art sind die nach überstandener Geisteskrankheit zurückbleibenden Veränderungen des Bewusstseinsinhaltes, welche wieder in zwei grosse Gruppen zerfallen, je nachdem sie qualitative: Bewusstseinsfälschungen oder quantitative: Defectzustände des Bewusstseins sind. Auf bei weitem complicirtere Krankheitserscheinungen stossen wir bei den eigentlichen Geisteskrankheiten, und zwar um so mehr, je acuter und stürmischer sie verlaufen. Der Gegensatz ist der zwischen ruhenden Zuständen und sich abwickelnden Krankheitsvorgängen, und es liegt in der Natur der Sache, dass die ersteren dem Verständniss weniger Schwierigkeiten bieten. Wenn wir uns an den früher aufgestellten Gegensatz zwischen Bewusstseinsinhalt und Bewusstseinsthätigkeit erinnern, so haben wir es hier genau mit demselben Verhältniss zu thun. Wir treffen also dann auf die relativ einfachsten Bedingungen,

Figure 22. Wernicke Grundiss der Psychiatrie / Ninth Lecture.

Source: Wernicke, Carl (1906) *Grundriss der Psychiatre*. Location: Charité Medical Library.p.6.

The first lecture of the monograph concerns the mentally ill and brain disorders. Brain diseases are defined as diseases of the projection system, mental illnesses as common diseases of the association organ — opposite of the primary and secondary identification in the language. Wernicke (1906: 1) believed that the mental illness is a branch of the internal medicine requiring a special treatment. Wernicke (1906: 2) indicated that melancholy and the sentimental mood a mental disorders. At the same time, he readily admitted that psychiatry has made considerable progress in his times. Wernicke believed that a teacher of psychiatry is instructed to focus on symptomatology at the expense of applying standards of another discipline The presupposition that mental illnesses are brain diseases is probably no longer disputed by any professional. Another significant work was the three-volume work *Anatomischer Atlas des Gehirns* (Atlas of the Anatomy of the Brain), which Wernicke prepared with his colleagues, recognized in the medical world. Among the authors was Otfrid Foerster [1873–1941], Wernicke's assistant, a German and world neurosurgery pioneer.

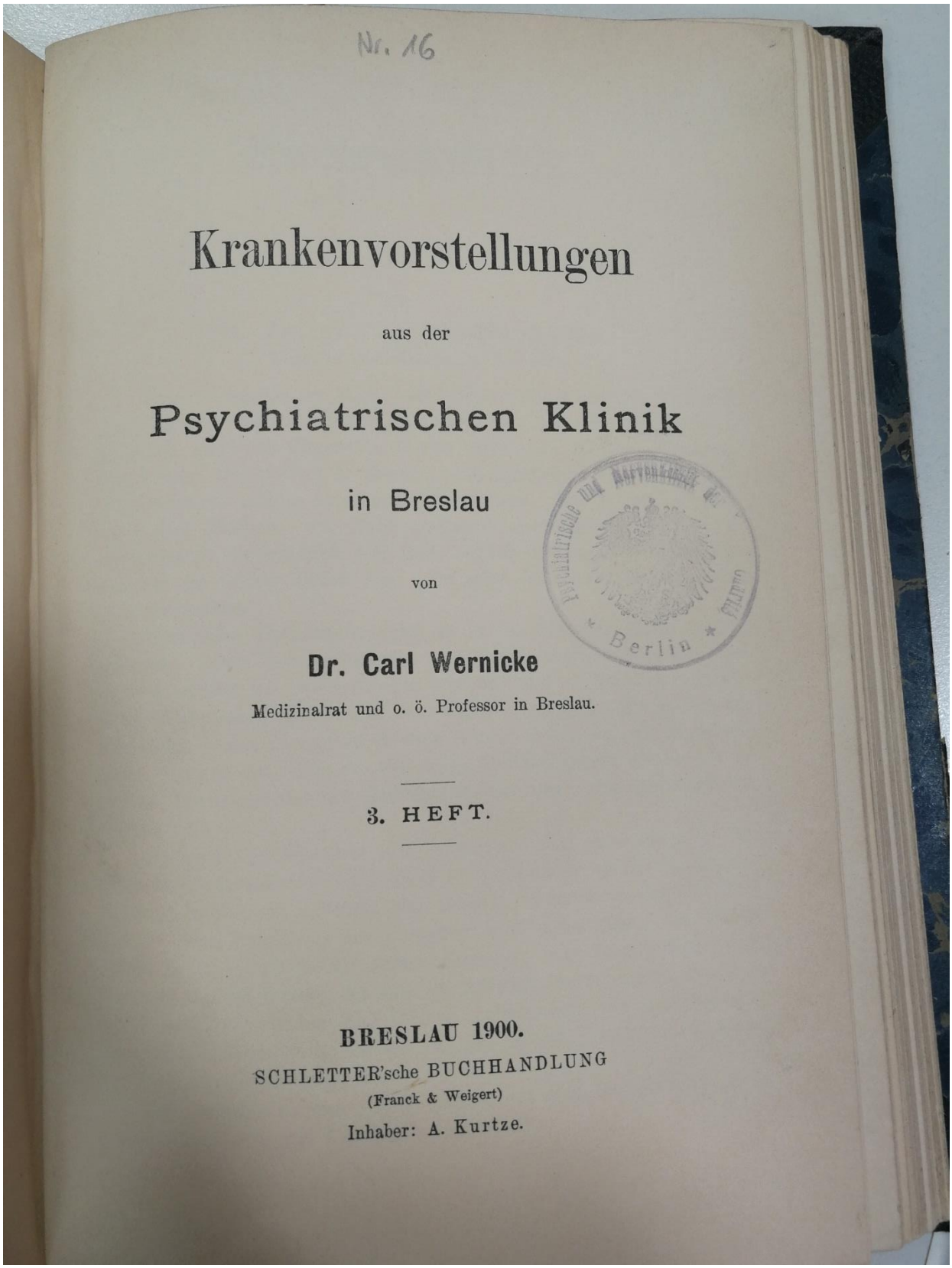


Figure 23. Wernicke, Carl (1900) Krankenvorstellungen aus der Psychiatrischen Klinik in Breslau.

Source: Wernicke, Carl (1900) *Krankenvorstellungen aus der Psychiatrischen Klinik in Breslau*. Location: Charité Medical Library.

2.4.3 Otfrid Foerster [1873–1941]

Otfrid Foerster (born on November 9, 1873, and died on June 15, 1941, in Wrocław) was a German neurologist, a professor at the University of Breslau.[11] Foerster was a world-famous student of Wernicke. He pioneered neurosurgery, contributing to the field's rapid development in the late 19th century (Kiejna, 2011: 22). He attended Maria Magdalena's grammar school in Breslau and studied at the University of Breslau. He passed the medical examination in 1896/97 and received his doctorate in March 1897. Carl Wernicke [1848–1904] dispatched Foerster to Paris to study with famous neurologists Joseph Jules Dejesine [1849–1917], Pierre Marie [1853–1940], and Joseph Babinski [1857–193]. In 1899, Foerster went to Breslau to work with Carl Wernicke, with whom he created a brain atlas in 1903. He was promoted to associate professor after completing his habilitation thesis in 1903.

Foerster lectured at the University of Breslau's Faculty of Medicine after being promoted to full professor in 1921. He was a pioneer in the field of neurosurgery across the world. He was also a corresponding member of the Warsaw Neurosurgical Society in 1922 and an honorary member of several international neurosurgical organizations (Aminoff and Daroff, 2014: 335–336). In 1911, Foerster founded Germany's first neurology department. He was appointed professor of neurology in Breslau at the age of 35 in 1917. He was in charge of a section at the Wenzel-Hancke Krankenhaus, a big municipal hospital, in 1921. In 1934, the Rockefeller Foundation funded the construction of the Institute of Neurology, which is located close to the hospital. His reputation as a neurologist extended across Europe. Vladimir Lenin [1970–1924], a Russian revolutionary, was his most famous patient, whom he treated for two years after Lenin suffered a stroke in 1922. (Aminoff and Daroff, 2014: 335–336). Otfrid Foerster made a considerable contribution to the development of neurological and

[11] Lipiński M., *Neurolog z Warszawy wyremontował niszczejący grób genialnego neurochirurga z Breslau, "Radio Wrocław*" Retrieved from http://www.radioWrocław.pl/articles/view/71816/Neurolog-z-Warszawy-wyremontowal-niszczejacy-grob-genialnego-neurochirurga-z-Breslau. Accessed 14.08.2018. [PL]

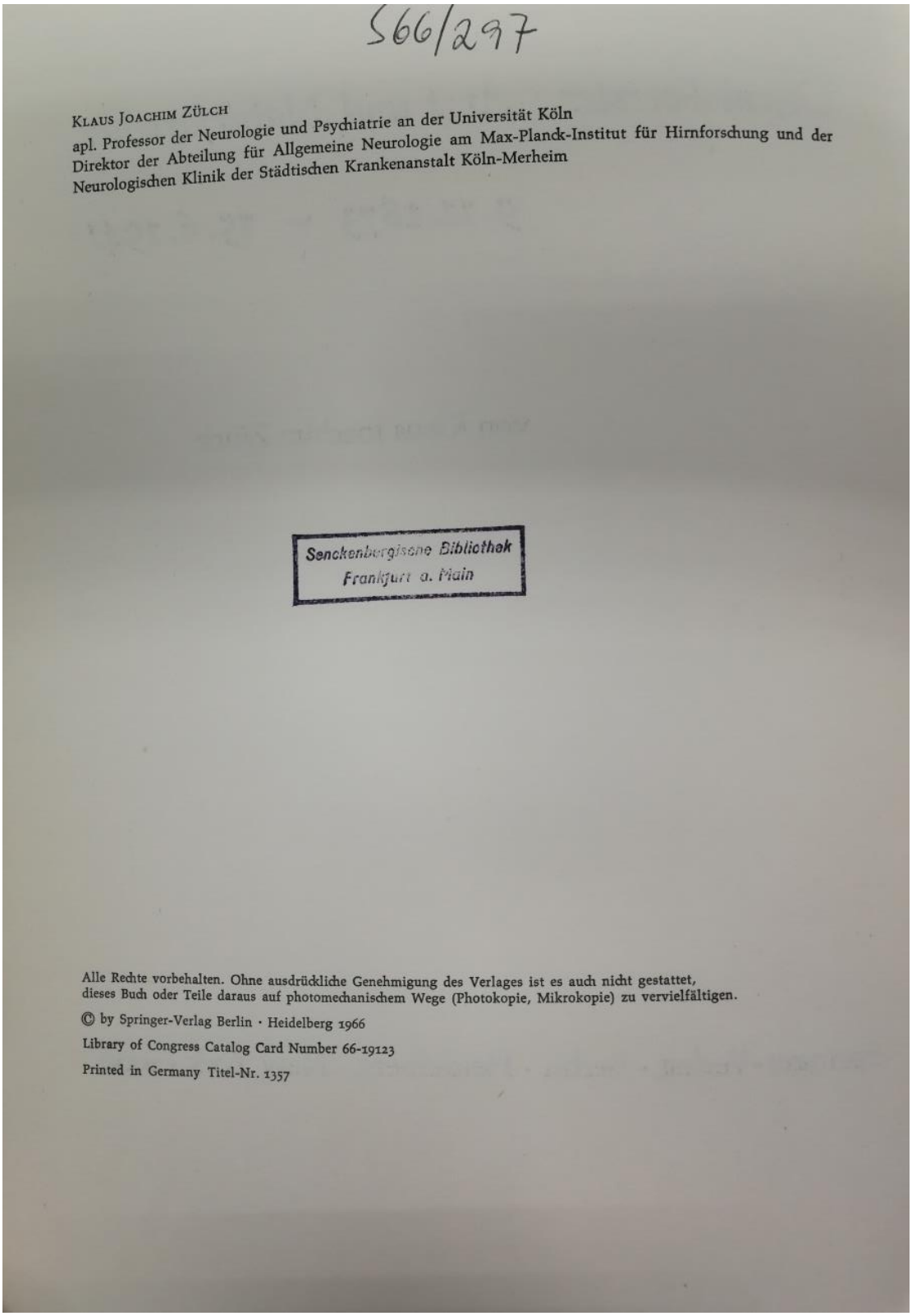
neurosurgical research worldwide. He also made Breslau a renowned center for scientific study, attracting researchers worldwide (Kiejna, 2011: 22–23). His achievements influenced many neurosurgeons during his lifetime. As a professor of the University of Breslau from 1917 to 1938 and an employee of the University Psychiatric Clinic, he developed an operational method of treating epilepsy. Until the end of his life, Foerster was associated with Breslau, which was commemorated by a plaque on the building of the present University of Economics.

Figure 24. A memorial plaque dedicated to Otfrid Foerster.

A memorial plaque dedicated to Otfrid Foerster, University of Wrocław. Photography: A. Daniel, 07.06.2020.

Figure 25. Zülch, Klaus-Joachim (1873) Otfrid Foerster – Arzt und Naturforscher.

Source: Zülch, Klaus-Joachim (1873) *Otfrid Foerster – Arzt und Naturforscher. Book describing the biography of Otfrid Foerster as a physician and naturalist.* Location: Central Library - *Universitätsbibliothek Frankfurt*.



S66/297

KLAUS JOACHIM ZÜLCH
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Figure 26. Zülch, Klaus-Joachim (1873) Otfrid Foerster – Arzt und Naturforscher.

Source: Zülch, Klaus-Joachim (1873) *Otfrid Foerster – Arzt und Naturforscher. Book describing the biography of Otfrid Foerster as a physician and naturalist.* Location: Central Library - *Universitätsbibliothek Frankfurt.*

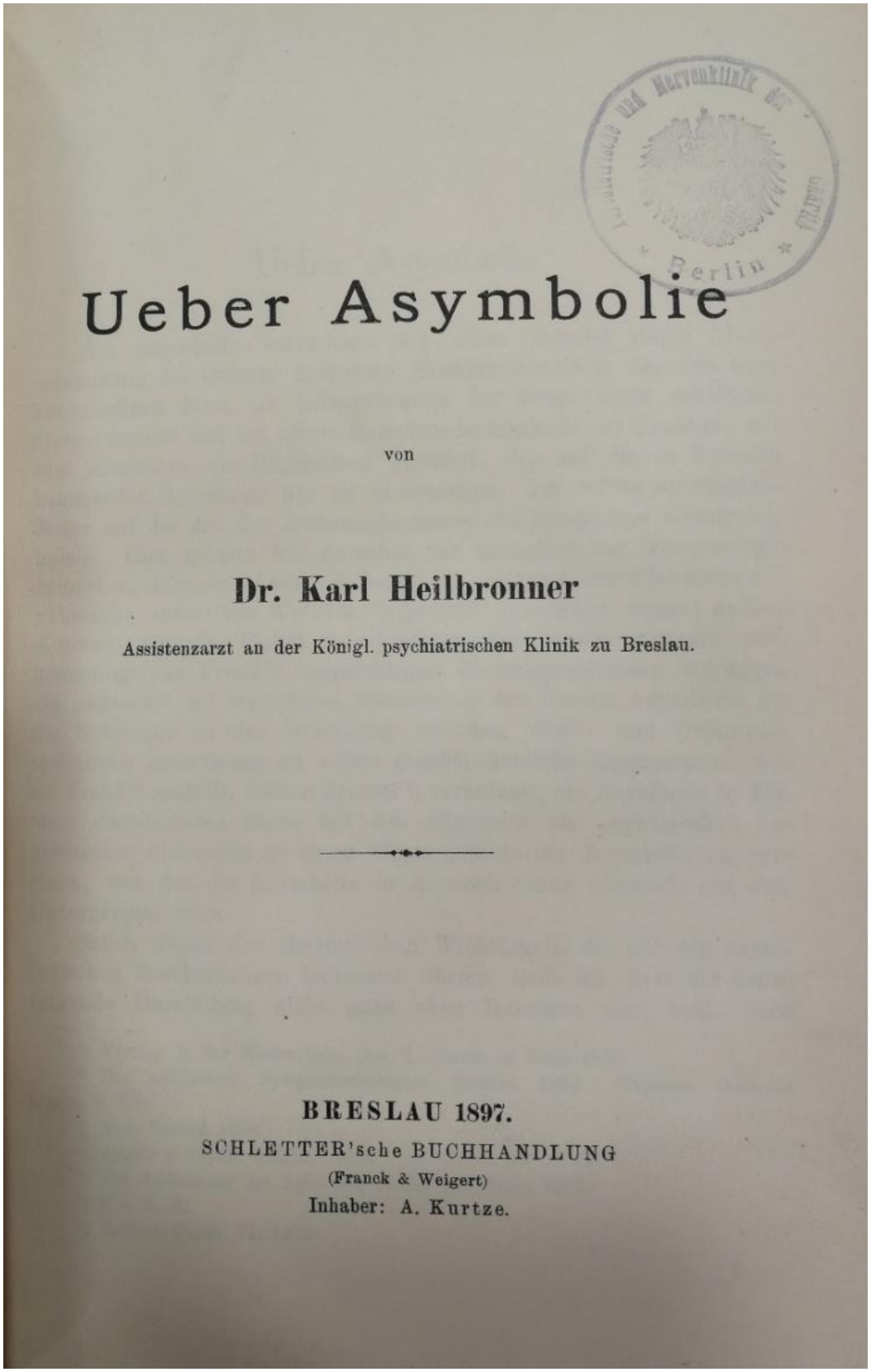
After Foerster there was coined a term describing compulsive punning called the Foerster's syndrome characterized by manic compulsive punning induced by the midbrain's stimulation (Tatu and Bogousslavsky, 2016: 188). His doctoral thesis on typhoid fever in 1897 was the only one of his 300 publications unrelated to the nervous system (Aminoff and Daroff, 2014: 335). At the University of Breslau, Foerster was highly influenced by Wernicke.

2.4.4 Karl Heilbronner [1869–1914]

Figure 27. Heilbronner, Karl: Aphasie und Geisteskrankheit, 1896.

Source: Heilbronner, Karl (1896) *Aphasie und Geisteskrankheit*. Location: Charité Medical Library.

Karl Heilbronner attended an elementary school in Nuremberg, then a gymnasium in Munich. He studied medicine at the Ludwig and Maximilian University in Munich and received the title in 1893 **(**Peiffer, 2004: 1019). Subsequently, he was a volunteer at the *Senckenberg Institute* in Frankfurt am Main for a short time, where he completed his knowledge of anatomy. From 1893 to 1898, he was an assistant to Carl Wernicke at the Department of Psychiatry and Nervous Diseases in Breslau (Peiffer, 2004: 1019). In 1898 Heilbronner became the head of the clinic of psychiatry and neurology in Halle. In 1901 he became a professor and, in 1903, was appointed to the chair of psychiatry at the University of Utrecht, where he replaced Theodor Ziehen [1862–1950]. In the obituary of Wernicke, which appeared in the *Allgemeine Zeitschrift fur Psychiatrie* in 1905, Heilbronner wrote that the psychiatry of Wernicke has not yet found an actual ending due to his tragic accident (Lanczik, 1988: 66). Karl Heilbronner believed it was impossible to separate psychiatry and neurology by dealing mainly with apraxia and organic causes of mental illnesses.



Ueber Asymbolie

von

Dr. Karl Heilbronner

Assistenzarzt an der Königl. psychiatrischen Klinik zu Breslau.

BRESLAU 1897.

SCHLETTER'sche BUCHHANDLUNG

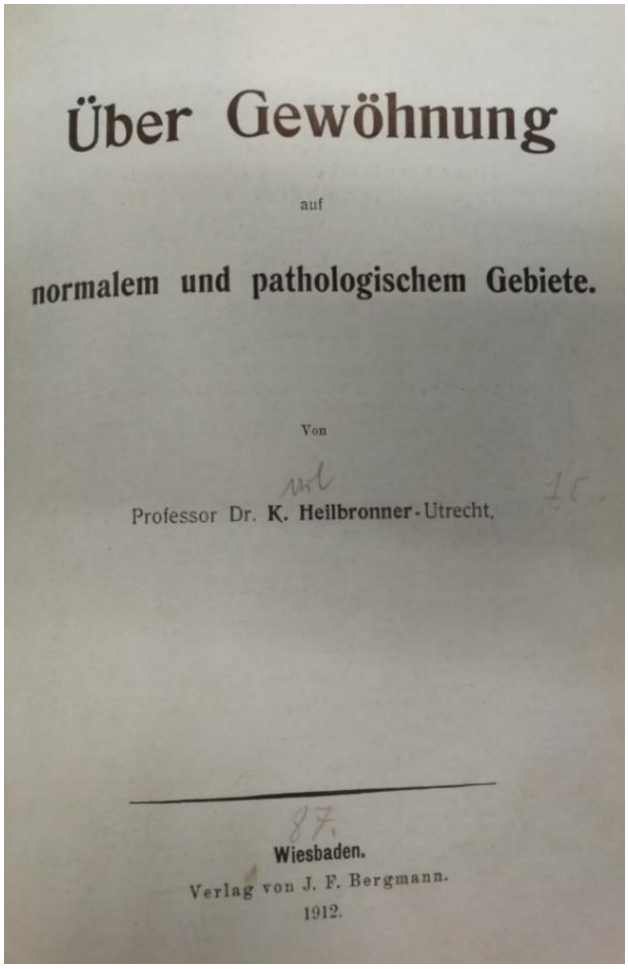
(Franck & Weigert)

Inhaber: A. Kurtze.

Figure 28. Heilbronner, Karl (1897) *Ü*ber Asymbolie.

Source: Heilbronner, Karl (1897) *Über Asymbolie*. Location: Charité Medical Library.

In the monograph, Heilbronner (1897: 1) remarks that the term *Asymbolie* was first used by Finkelnburg[12], and later by Wernicke[13]. However, other authors prefer the name apraxia. Nonetheless, not long ago, Freud[14] (5) proposed the use of the term "Agnosia" (Heilbronner, 1897: 1). At the same time, he believed that the name *Asymbolie* is supposed to be reserved for disturbances in the relation between the word and the object.


Über Gewöhnung

auf

normalem und pathologischem Gebiete.

Von

Professor Dr. K. Heilbronner-Utrecht.

Wiesbaden.
Verlag von J. F. Bergmann.
1912.

Figure 29. Über Gewohnung aud normalem und pathologischen Gebiete. Karl Heillbronner, Wiesbaden 1912.

Source: Heillbronner, Karl (1912) *Über Gewohnung aud normalem und pathologischen Gebiete. Karl Heillbronner Location:* Location: Central Library - *Universitätsbibliothek* Frankfurt.

[12] Vortrag in der Niederrhein. Ges.d.Aertze in Bonn 1870
[13] Der aphasische Symptomencomplex Breslau 1874. (Gesamm. Abhandlungen S. 33)
[14] Zur Aufassung der Aphasien, Berlin und Wien 1891

2.4.5 Karl Bonhoeffer [1868–1948]

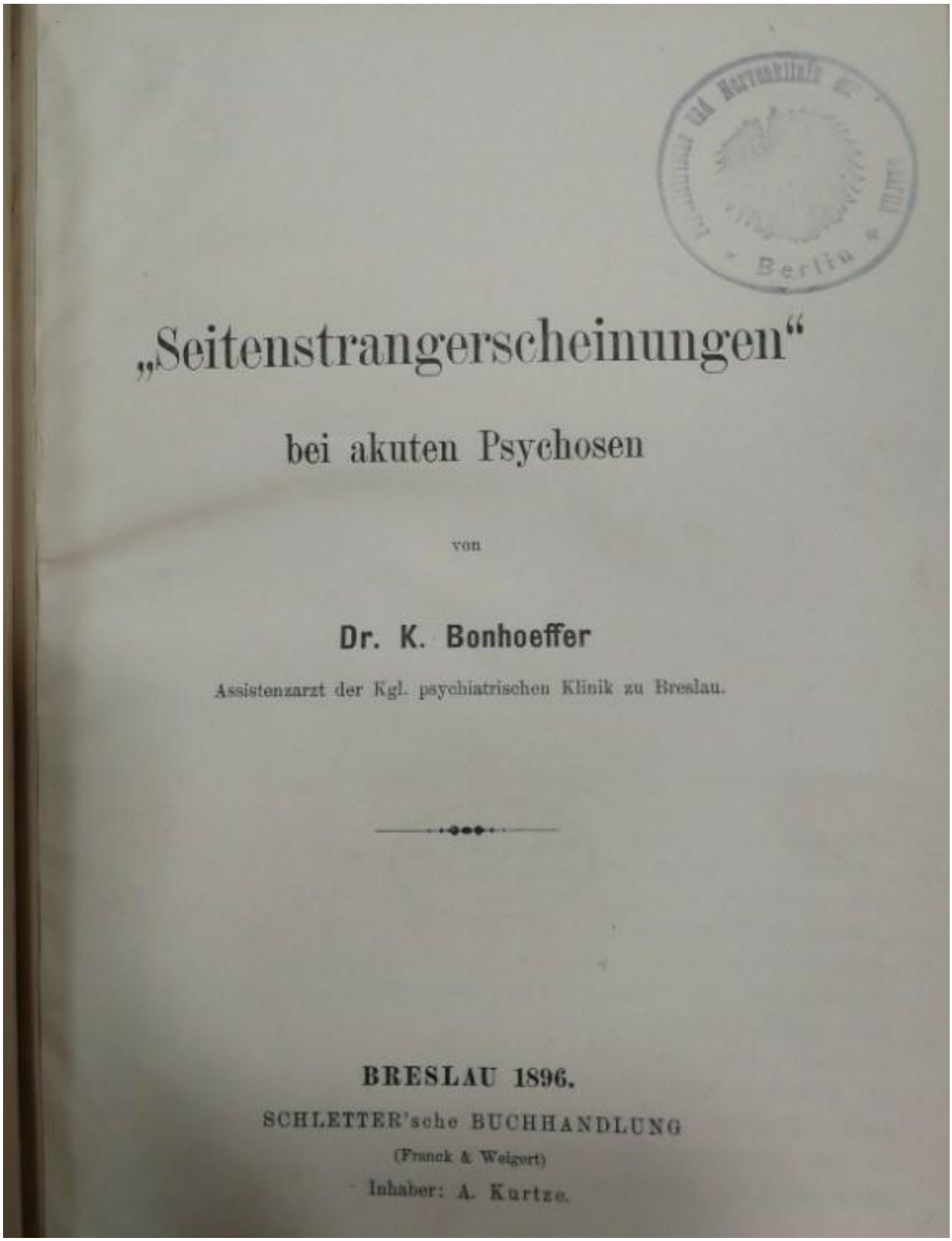
Figure 30. Karl Bonhoeffer with students of medicine, the year 1887 in Tubingen.

Source - Bonhoeffer, Karl (1990) *Leben und Werk eines Deutschen Psychiaters und Neurologen in seiner Zeit*. No page number. Location: Central Library - *Universitätsbibliothek* Frankfurt.

One of the most important successors of Wernicke was Karl Bonhoeffer[15]. In 1874–1878, Karl Bonhoeffer attended an elementary school in Heilbronn and Ravensburg; from 1878 to 1886, he attended a gymnasium in Tübingen. In the years 1886–1887, he served in the army in Stuttgart. After receiving a license to practice, he worked in Heidenheim an der Brenz. As a doctor who completed military service, he was promoted to a medical officer. After a few years, he became the head of a psychiatric clinic and an observation station for "mentally ill criminals" in Breslau. In 1897, he obtained his habilitation at the University of Wrocław. It was there where Bonhoeffer's scientific works on the consequences of alcoholism, degenerative processes in the brain, and symptomatic psychoses were created, which guaranteed him recognition (Kiejna, Widawski, 2011: 23). From 1903 to 1904, he worked in Królewiec (in German: Königsberg) and Heidelberg. In 1904, as Carl Wernicke's successor, he took over the chair at the University of Breslau.

In 1912, Karl Bonhoeffer succeeded Theodor Ziehen [1862–1950] as a full professor of psychiatry and neurology at the University of Berlin and the director of the university clinic of psychiatry and neurology at the Charité Hospital. He held these positions until his retirement in 1938. Bonhoeffer intended to establish psychiatry as an independent medical discipline and to develop it further. He advocated that "nervous suffering and temperaments" should also be handled by specialist doctors (Rasmussen, 1970: 136). As a forensic officer, Bonhoeffer was responsible for all areas of psychiatric diagnostics, hence he was also responsible for assigning the prepared diagnosis an appropriate professional term, which was binding in the penal code at the time (Rasmussen, 1970: 136). Interestingly, Karl Bonhoeffer presented the psychological evidence that proved Adolf Hitler's mental health made him entirely incapable of ruling a nation.

[15] *Biografie niemieckie i inne*. Retrieved from https://www.biografie-niemieckie.pl/bonhoeffer-karl-ludwig. Accessed: 25.04.2019



„Seitenstrangerscheinungen“

bei akuten Psychosen

von

Dr. K. Bonhoeffer

Assistenzarzt der Kgl. psychiatrischen Klinik zu Breslau.

BRESLAU 1896.

SCHLETTER'sche BUCHHANDLUNG

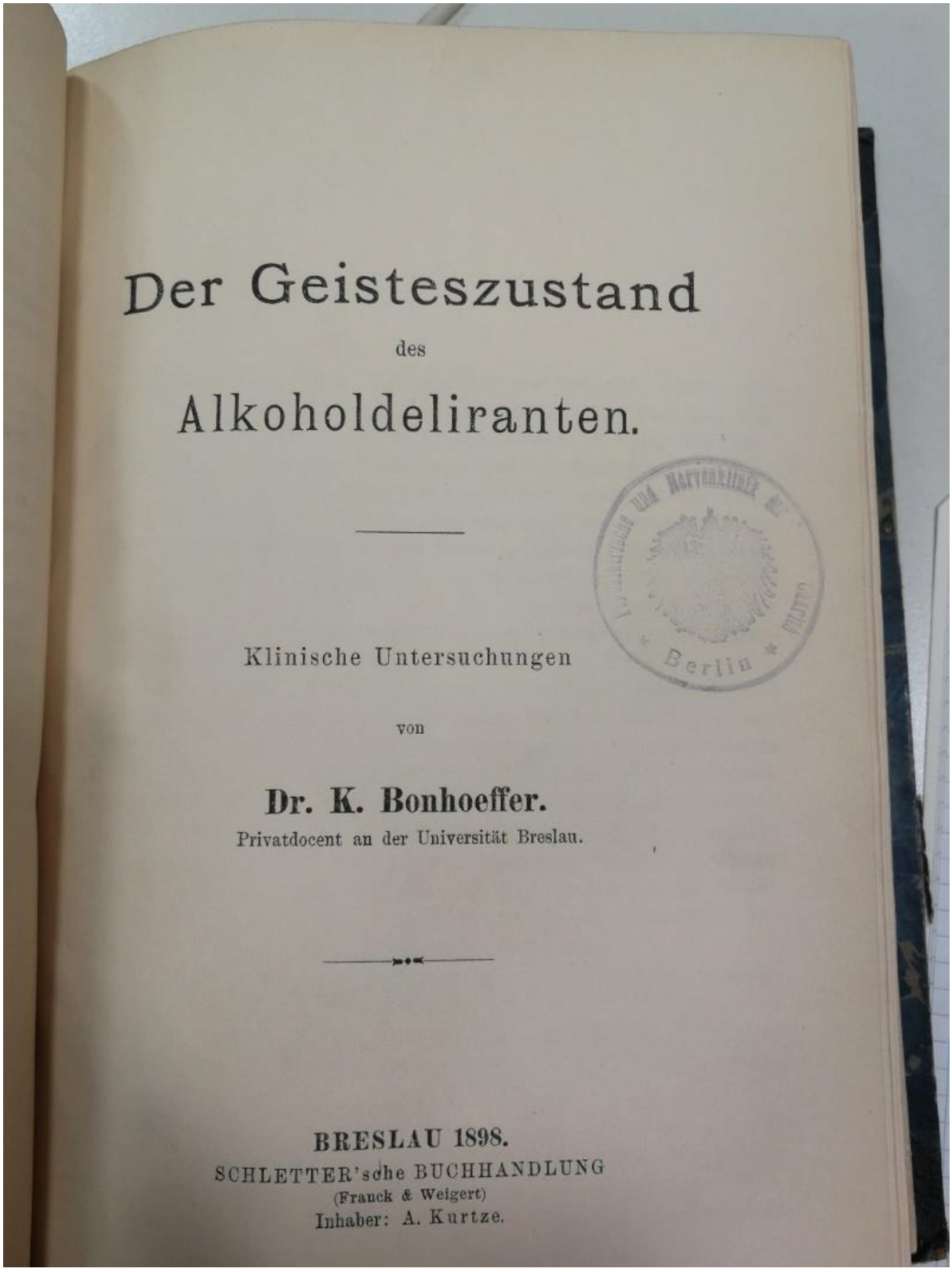
(Franck & Weigert)

Inhaber: A. Kurtze.

Figure 31. Seitenstrangerscheinungen” bei akuten Psychosen.

Source: Bonhoeffer, Karl (1896) *Seitenstrangerscheinungen” bei akuten Psychosen.* Location: Charité Medical Library.

Bonhoeffer (1896: 1), in his *work "Seitenstrangerscheinungen" Bei Akuten Psychosen,* admitted that on the subject of acute psychosis, he had made an observation several times, which, as far as he knew, had yet received no attention in the literature. Not because the phenomenon was rare, but it was overlooked even if a person was not accustomed to it or during the most acute and agitated stages of the disease. Interestingly, Klaus Bonhoeffer [1901–1945], Bonhoeffer's elder son, was a well-known German lawyer and a member of the anti-Nazi opposition who was accused of the attack on Adolf Hitler. As Karl Bonhoeffer has been forced to sterilize the mentally ill, he ultimately left Breslau. At that time, psychiatry often served politics and totalitarian doctrines (Kiejna, Widawski, 2011: 24). Nevertheless, great names such as Alois Alzheimer still appeared in Breslau. Famous researchers have come here to carry out their scientific and clinical activities.



Der Geisteszustand

des

Alkoholdeliranten.

Klinische Untersuchungen

von

Dr. K. Bonhoeffer.

Privatdocent an der Universität Breslau.

BRESLAU 1898.

SCHLETTER'sche BUCHHANDLUNG

(Franck & Weigert)

Inhaber: A. Kurtze.

Figure 32. Der Geisteszustand des Alkoholdeliranten.

Source: Bonhoeffer, Karl (1898) Der Geisteszustand des Alkoholdeliranten. Location: Charité Medical Library.

If one examines the many unexplored and unclear areas that we still have in psychopathology, one may ask oneself that it does not carry owls to Athens, which means to make the symptomatology of delirium tremens the subject of an investigation. It is precisely this disease that appears in terms of etiology, symptoms, and course within the rest fluctuating forms of disease represent the best known, most complete, and at least variable psychosis. From the outset, not much new is expected here for the practical purposes of diagnosis and prognosis of symptomatologic examinations.

If, however, I chose this most famous toxic psychosis, it was because of me, in particular, that it was so commonplace developing under known aetiological conditions and, at least in this country, the disease presenting itself to observation often seems particularly suitable, that in the constant sequence of phenomena to investigate more revealing laws and to come closer to a deepening of the symptomatologic conception. In doing so, I believed I could promise that the position taken in our clinic would, in some respects, yield useful points of view. As much as close observation and description of spontaneous delirium are worth their own, it is not enough. Nevertheless, it is precisely in delirious cases for investigations that bear more the experiment's character in a favorable position. Apart from the frequency and similarity of the disease, the delinquent's psychic qualities, his easy influence, and willingness to contribute, his affections' proper sustainability favors the investigations. The duration of the disease gives a comfortable control of the same man in a healthy condition (Bonhoeffer, 1898: 1). Finally, disturbing individual factors, which we otherwise see performing a big role, here have almost no meaning. The following explanations follow in the main the purpose of reproducing the results of a series of investigations on the course of the presentation as it takes place at the delirium state under the application of various experimental conditions (Bonhoeffer, 1898: 2). Following this, I briefly discussed the spontaneous mental symptoms as far as they seemed important to me and had not been described in the earlier ones (Bonhoeffer, 1898: 2). (Translation – Aneta Daniel).

Wernicke rightly emphasized the total falsification of the external world's image as the dominant phenomenon in the psychic complex of delirium tremens[16] (Bonhoeffer, 1898: 2). Accordingly, the investigation into the emergence of illusions and hallucinations will subsequently have to occupy a correspondingly large space. In the dependency in which the correct view of the outside world is determined by the functional potential of the sensors, in the case of the well-known inclination to illusions in the case of an insufficient sharpness of the sense-perception, a systematic investigation of the efficiency of the perceptive organs will first be necessary.

2.4.6 Alois Alzheimer [1864–1915]

Figure 33. A memorial plaque dedicated to prof. Alois Alzheimer. Wrocław. Bujwida 42 Street. Photofraphy by A. Daniel. 05.04.2019.

[16] Delirium tremens - is a rapid onset of confusion usually caused by withdrawal from alcohol.

Figure 34. Grave of Alois Alzheimer and his wife, Cecylia.[17]

[17] Hauptfriedhof (Frankfurt am Main) Picture: Aneta Daniel 31st od May, 2019.

Alois Alzheimer was born in 1864 in the Bavarian town of Marktbreit. In 1883 he started medical studies in Berlin (Stertz, 1953: 236). He also studied in Tübingen and Würzburg, where in 1887, he obtained a medical doctor diploma. In the same year, he presented his doctoral dissertation on the histology of the wax glands, based on his research in the laboratory of Rudolf Albert von Kölliker. In 1889, he started working in a psychiatric institution (in German: *Städtische Anstalt für Irre und Epileptische*) in Frankfurt am Main (Stertz, 1953: 236). In 1912, as a full professor, he became the head of the Department of Psychiatry at the University of Breslau and the director of a psychiatric clinic (German: *Königlich Psychiatrischen und Nervenklinik*).

Alzheimer described one of the best-known diseases these days - the most common cause of dementia in the elderly, Alzheimer's disease. It is a progressive neurodegenerative illness characterized by a spectrum of clinical features and neuropathologic findings (Feldman, 2007: 1). Cognitive impairment and psychiatric disturbances in Alzheimer's disease (AD) result from the dysfunction and degeneration of synapses, and the consequent death of neurons in the limbic system and associated regions of the cerebral cortex (Tarazi and Schetz: 2005: 51). Alzheimer's disease is a devastating, and always fatal, neurodegenerative disorder characterized by a progressive cognitive impairment and emotional disturbances.

In 1915 Alzheimer's health deteriorated rapidly. He suffered from heart problems, shortness of breath, and kidney failure. He died shortly afterward in Breslau, on December 19, 1915, at the age of 51. He was buried at the Main Cemetery in Frankfurt am Main, next to his wife. The relationship between Alzheimer and Wrocław was commemorated in 1995 on the initiative of Andrzej Kiejna, with a commemorative memorial plaque (Kiejna, 2011: 29). The plaque is located on the front wall of the former director's villa at number 42 at today's Bujwida Street.Alzheimer's successor was Oswald Bumke from 1916 to 1921, followed by Robert Wollenberg (from 1921 to 1930). The next managers were Johannes Lange and Werner Villinger in 1930-38, from 1938 to 1945.

2.4.7 Oswald Bumke [1877–1950]

Figure 35. Oswald Bumke[18].

[18] Picture retrieved from https://www.semanticscholar.org/paper/Neuroscience-in-Nazi-Europe-part-II%3A-resistance-the Zeidman/73b8cddf66e38346d1b7fd601bcaca565bac9d7c. Accessed: 12.12.2020.

Oswald Bumke[19] as a medical doctor during the war took care of Lenin. After assassination attempt on Lenin in 1918, the wounded Lenin never fully recovered. Two bullets hit him. Efficient syphilis hampered the effective treatment. On May 26, 1922, Lenin fell victim to the first attack of paralysis, but on October 2, he returned to the Kremlin. In December, the paralysis attack repeated itself. The third attack, on March 9, 1923, finally immobilized him. Further violent deterioration of Lenin's health took place in January 1924. It was decided to call a famous Pole, a neurology professor - Oswald Bumke to Lenin's death bed.

Professor Dr. Oswald Bumke was born on September 25, 1877, in Stolp, today's Słupsk. He was a graduate of the Gymnasium at Wasserstrasse (currently LO No. 1). He lived on Wilhelmstrasse (now Army 33). He graduated from medical studies. As an associate professor, he lectured in Freiburg, Breslau, and Leipzig, then - as a full professor of psychiatry and neurology - at the University of Munich. He was the author of many scientific works in the field of psychiatry, among others “Diagnosing the mentally ill”, “Lectures on psychiatry”, “Culture and degeneration”. He also gained a worldwide reputation as a neurologist. Bumke was a determined advocate of the concept of psychiatry and neurology being combined into one subject at university and to have it accommodated in one clinic for nervous disorders. Bumke presumed that psychiatric and neurological diseases affected the same organ system. The affliction of the nervous system could lead to psychiatric and neurological disorders.

By combing psychiatry and neurology into a medicine for nervous diseases, Bumke hoped to achieve several aims: one of them was for psychiatric patients to get treatment easier. By admitting psychiatric and neurological patients to the same clinic, psychiatric patients' stigmatization should be overcome Hippius et al. [2004] 2007: 113). Without the connection to neurology, the danger existed that pure psychiatry would fall too strongly into the field of speculation.

[19] http://stara.mojemiasto.slupsk.pl/index.php?id=21 Accessed: 17.11.2020.

2.4.8 Edmund Forster [1878–1933]

Edmund Forster was one of Carl Wernicke's most fascinating students. Forster was a German psychiatrist and neurologist who served as a chief surgeon in the German imperial navy before becoming the first senior doctor at the Charité University Hospital in Berlin and subsequently a professor at Greifswald University Hospital from 1925 onwards. (Armbruster and Theiss-abendroth, 2016: 57). He worked as a surgeon during World War I, and one of his patients was Adolf Hitler. Forster used hypnosis on Hitler. Foerster wrote in records during therapy that Hitler was a maniac. As repression began in 1933, it has been thought that Hitler wanted these medical data, and there are numerous indications that this is why Forster committed suicide. (Zalampas, 1990: 30). When Hitler was exposed to toxic gas in Warwick, according to Dr. Forster, his personality changed dramatically. On Hitler's own admission, Dr. Edmund Forster examined him and classified him as a psychopath with hysterical symptoms.

The American historian Rudoph Binion claimed in 1976 that Forster was in charge of Hitler's care and that this, together with the dread of repressions, was the cause of Forster's death. The first is a US Navy intelligence report from March 1943, which details testimony provided in Reykjavik by Jewish refugee Karl Kroner (1878–1954), who claimed to have been present during Hitler's medical examination and served as a neuropsychiatrist in Berlin. (Armbruster and Theiss-abendroth, 2016: 57). Dr. Forster was fired from his clinic, and his wife discovered him dead in his toilet on September 11th, following a Gestapo questioning. (Hant, 2010). Despite this, there are no archival documents that support the hypothesis. There is speculation that Hitler's mental health deteriorated as a result of either a severe psychic trauma suffered when his unit was attacked with mustard gas in the trenches near the Belgian town of Ypern in October 1918, or psychiatric treatment administered by Wernicke's student, Forster, which he allegedly received later in the Northern German town of Pasewalk. (Armbruster and Theiss-abendroth, 2016: 56).

It is impossible to verify that Edmund Forster ever treated Hitler since the medical documents are missing. According to Armbruster and Theiss-abendroth:

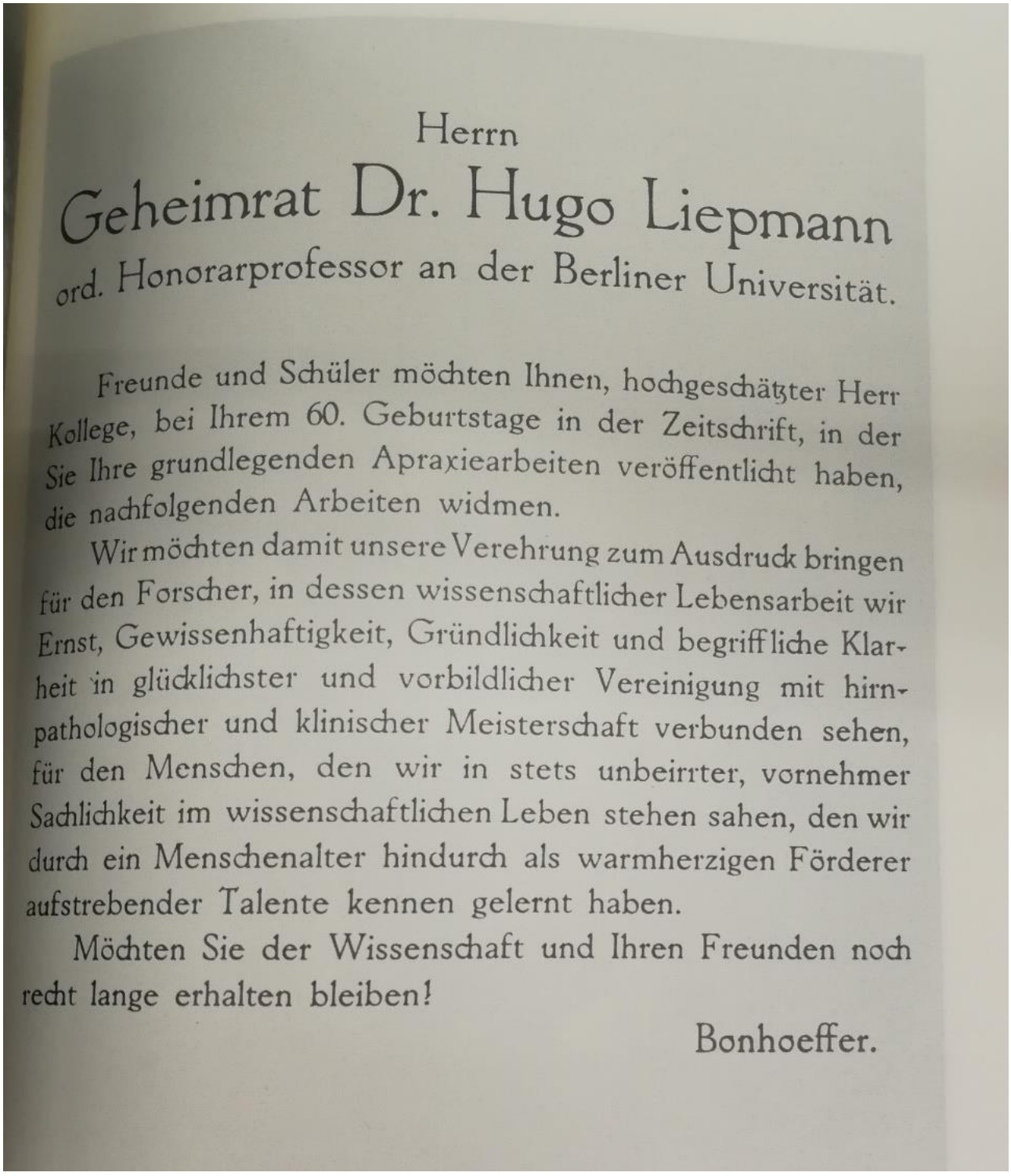
> (…) recent contributions have publicized a myth that seems problematic in two ways: on the one hand, it reduces Edmund Forster to having been Hitler's therapist, which does not do justice to his personality and achievements. On the other hand – and this weighs more heavily – it diminishes and relativizes Hitler's responsibility for his acts (Armbruster and Theiss-abendroth, 2016: 58) It is worth adding that in such a case when the sources which are the most valuable are missing, in fact, the real Hitler's stay at Pasewalk military hospital and, most importantly, the actual proof of Hitler's mental illness, can never be genuinely proven.

Despite the fact that the Western Front event, Hitler's temporary blindness, and his medical care in the Pomeranian town are all established facts, the rumors spread quickly and are unsupported by any solid proof.

2.4.9 Hugo Liepmann [1863–1927]

Figure 36. Hugo Liepmann [1863–1927].

Source: Bonhoeffer, Karl (1990) *Leben und Werk eines Deutschen Psychiaters und Neurologen in seiner Zeit*. No page number. Location: Central Library - *Universitätsbibliothek* Frankfurt.



Herrn

Geheimrat Dr. Hugo Liepmann

ord. Honorarprofessor an der Berliner Universität.

Freunde und Schüler möchten Ihnen, hochgeschätzter Herr Kollege, bei Ihrem 60. Geburtstage in der Zeitschrift, in der Sie Ihre grundlegenden Apraxiearbeiten veröffentlicht haben, die nachfolgenden Arbeiten widmen.

Wir möchten damit unsere Verehrung zum Ausdruck bringen für den Forscher, in dessen wissenschaftlicher Lebensarbeit wir Ernst, Gewissenhaftigkeit, Gründlichkeit und begriffliche Klarheit in glücklichster und vorbildlicher Vereinigung mit hirnpathologischer und klinischer Meisterschaft verbunden sehen, für den Menschen, den wir in stets unbeirrter, vornehmer Sachlichkeit im wissenschaftlichen Leben stehen sahen, den wir durch ein Menschenalter hindurch als warmherzigen Förderer aufstrebender Talente kennen gelernt haben.

Möchten Sie der Wissenschaft und Ihren Freunden noch recht lange erhalten bleiben!

Bonhoeffer.

Figure 37. Bonhoeffer's Lecture on Liepmann's 60th Birthday in the Monthly Journal of Psychiatry and Neurology 1923.

Source: Bonhoeffer, Karl (1990) *Leben und Werk eines Deutschen Psychiaters und Neurologen in seiner Zeit*. No page numeber. Location: Central Library - *Universitätsbibliothek* Frankfurt.

[Source text]

Herrn
Geheimrat Dr. Hugo Liepmann Ord. Honorarprofessor an der Berliner *Universität*.
Freunde und Schüler möchten Ihnen, hochgeschätzter Herr Kollege, bei Ihrem 60. Geburtstage in der Zeitschrift, in der der Sie Ihre grundlegenden Apraxie arbeiten veröffentlicht haben, die nachfolgenden Arbeiten widmen.

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Möchten Sie der Wissenschaft und Ihren Freunden noch recht lange erhalten bleiben!
Bonhoeffer.

Mr.
Privy Councilor Dr. Hugo Liepmann Ord. Honorary Professor at the Berlin University.
Friends and students would like to dedicate the following work to you, dear colleague, on your 60th Birthday in the magazine where you published your essential apraxia work.
We want to express our admiration for the researcher, in whose scientific life work we are profound, conscientious, thorough, and conceptual clarity in the happiest and more exemplary manner. Seeing combined union with brain pathological and clinical mastery, for the person we saw standing in the scientific life with always unswerving, refined objectivity, and whom we have come to know through a generation as a warm-hearted advocate of emerging talents. Would you like to stay with science and your friends for a long time to come!

Bonhoeffer
[Translation Aneta Daniel]

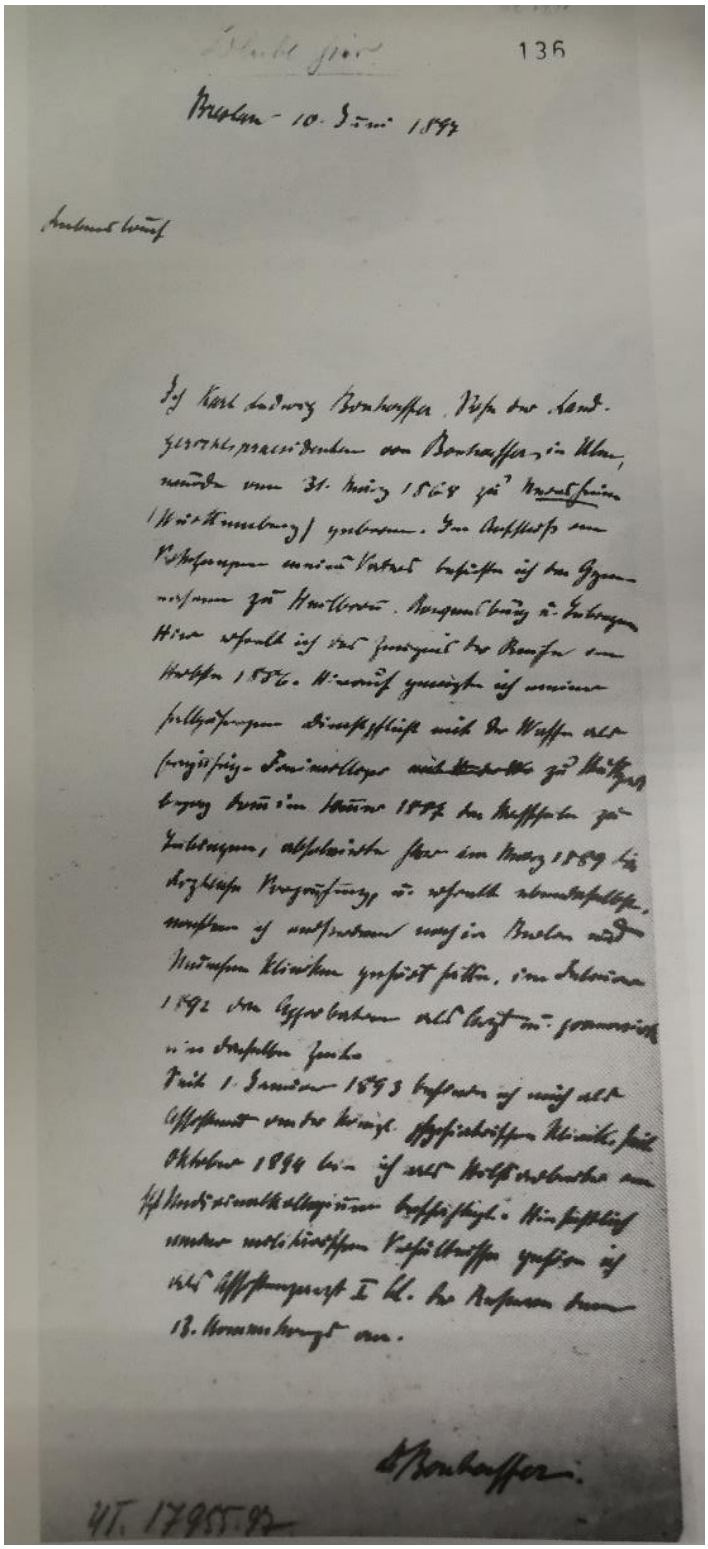


Figure 38. Lebenslauf zur Habilitation an der Medizinischen Fakultät der Königlichen *Universität* Breslau.

Source: Bonhoeffer, Karl (1990) *Leben und Werk eines Deutschen Psychiaters und Neurologen in seiner Zeit*. No page number. Location: Central Library - *Universitätsbibliothek* Frankfurt.

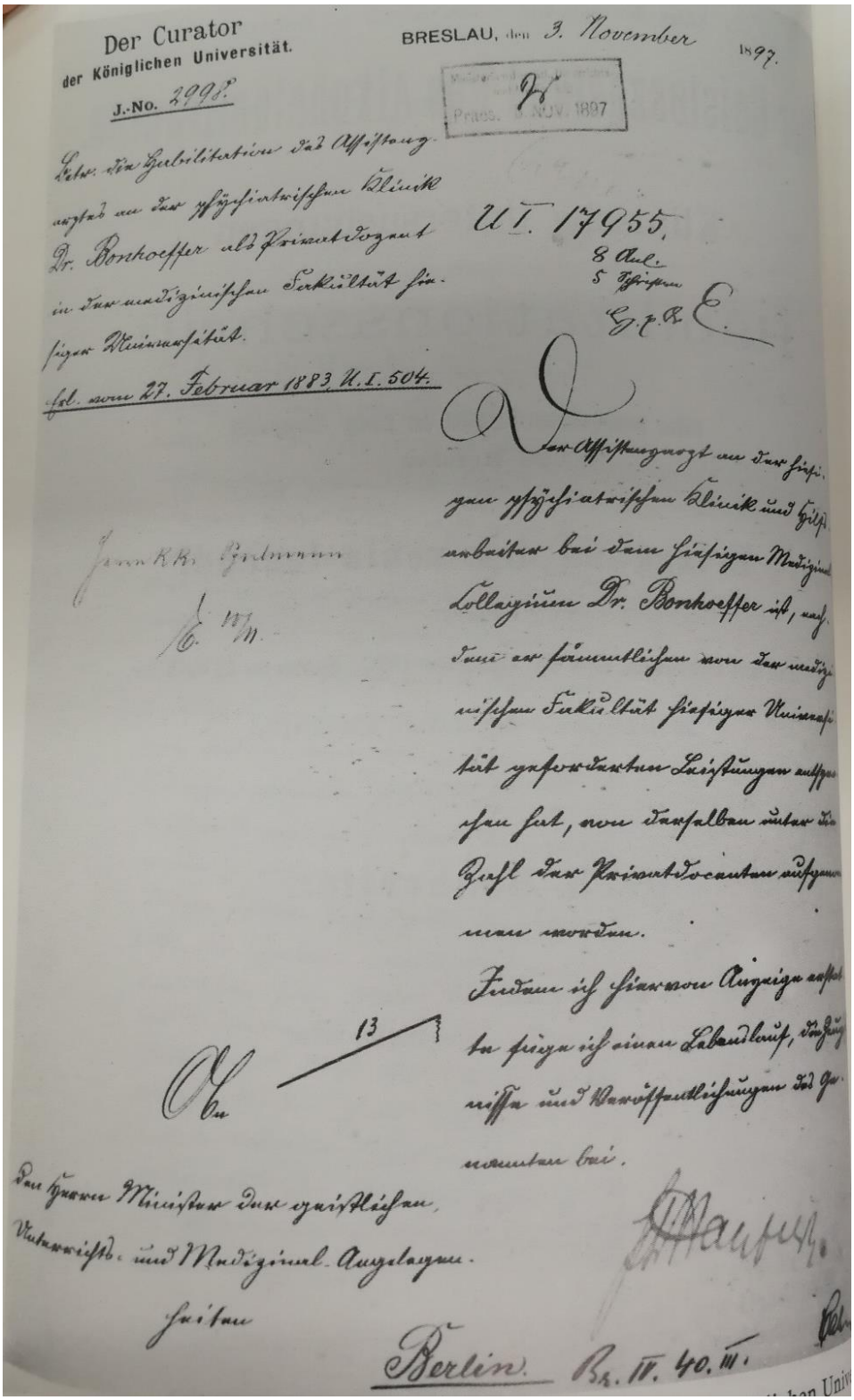


Figure 39. Letter of appointment to a private lecturer at the Royal University of Wrocław.

Source: Bonhoeffer, Karl (1990) *Leben und Werk eines Deutschen Psychiaters und Neurologen in seiner Zeit*. No page number. Location: Central Library - *Universitätsbibliothek* Frankfurt.

Ein Fall

von reiner Sprachtaubheit

von

Dr. phil. et med. **H. Liepmann,**
Assistenzarzt der Königl. Psychiatr. Klinik zu Breslau.

BRESLAU 1898.
SCHLETTER'sche BUCHHANDLUNG
(Franck & Weigert)
Inhaber: A. Kurtze.

Figure 40. Ein Fall von reiner Sprachtaubheit.

Source: Liepmann, Hugo (1898) *Ein Fall von reiner Sprachtaubheit.*Location: Charité Medical Library.

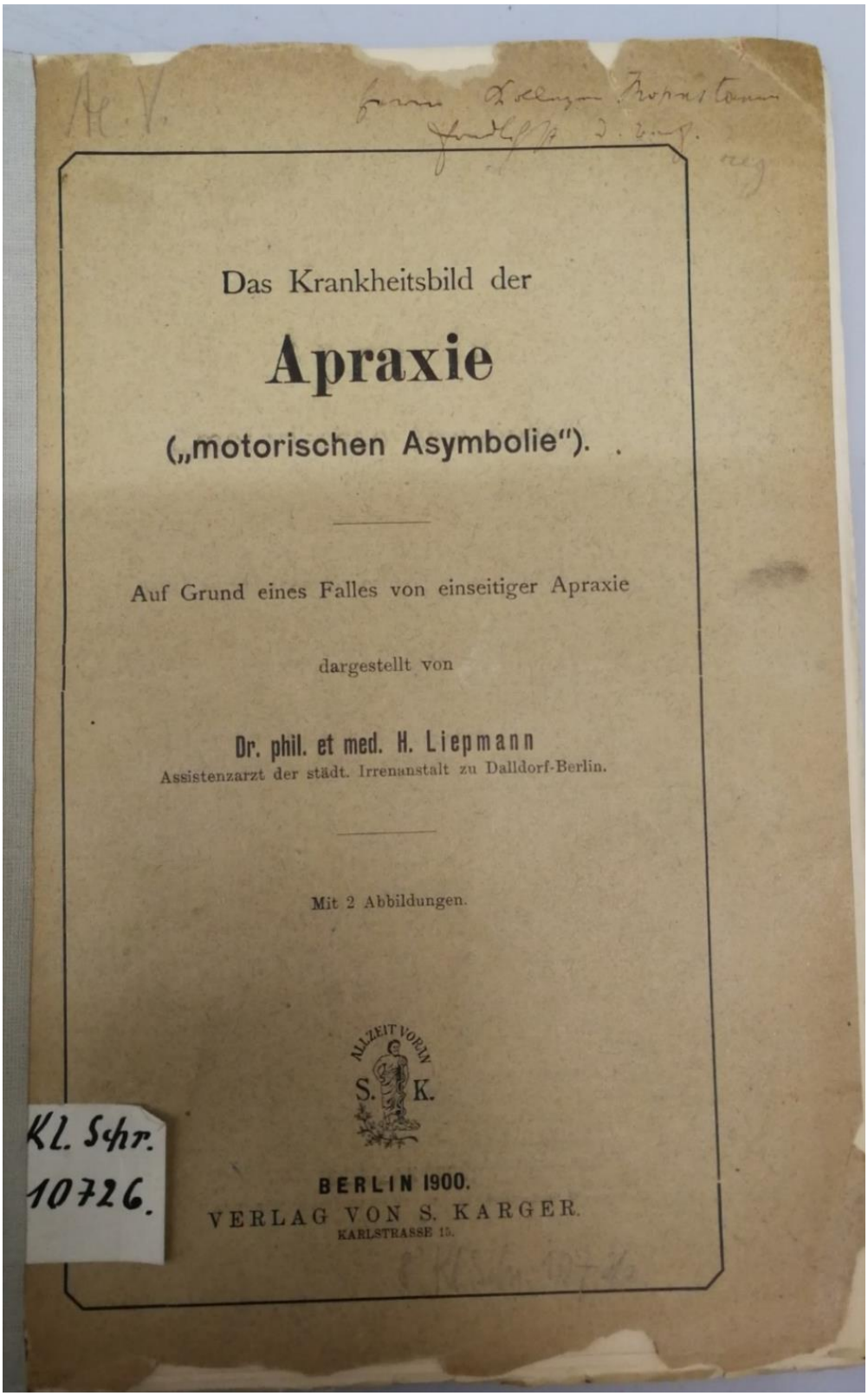
The subcortical sensory aphasia of *Lichtheim's disease*[20] has not been able to gain the general and unequivocal appreciation like other forms of speech disorders, especially of cortical, motor, and sensory aphasia. Especially in these years, the disease picture has received complaints from various sources (Liepmann, 1989: 1). The picture of illness should be characterized by a suppressed understanding of speech, recitation, and dictation writing with an existing ability to hear and by the intactness of all other expressive and receptive language readings.

Liepmann (1898: 1) looks here from the note in the name to a specific position of the hearth and only focus on the described clinical picture. It is possible to reduce the three mentioned failure symptoms to a fundamental defect: the spoken words are not precipitated even as a mere clause, even the primary Wernicke's identification does not take place that they can then neither be re-enrolled, nor written down, nor understood in their meaning, it is the obvious consequence of this defect (Liepmann, 1989: 1). Therefore, the disease picture is also referred to briefly. Without localization as linguistic ability to prevent confusion with the canny and transcortical aphasia, many of which are also known as gawp-form, it is advisable to refer to the subcortical as pure speech-deafness (Liepmann, 1989: 2).There is some linguistic evidence for the pure language deafness already provided by the older authors. First was the Lichtheim's case (1885), then (1886) Wernicke brought a brief note about an analogous case that he observed. In 1892, a case of pick, which was to be discussed more closely, followed, in which, for the first time, a report was made. The section revealed *bilateral foci* in the sleep lobe.

This was the expression of the thought, which has since been taken up by various authors, the existence of the illness in the sense of Lichtheim and Wernicke threatened. Both researchers found the subcortical sensory aphasia to be a pure disturbance of speech perception. The speech deadening should be a consequence of the hearing's general disturbance - at least in most cases (Liepmann, 1989: 2–3). C.S. Freund has most emphatically put this idea into practice and presented it

[20] Also known as subacute combined degeneration of the spinal cord, occurs due to damage to the layers that surround nerve fibers. Its cause is thought to be vitamin B12 deficiency.

in his work [“*Labyrinthtaubheit und Sprache-taubheit*”] *“Labyrinth Deafness and Speech Deafness*” (1895). Freund has subjected two patients, who showed horror with disavowed language comprehension, to a careful examination, and his second case is identical to the mentioned case of Wernicke. Freund made it known that both cases had the bilateral labyrinthine disease. Both patients were deaf in one ear and had larger defects on the other as revealed by examination with tuning forks. In particular, Wernicke's patient showed the defect already described by him for high tones (Liepmann, 1989: 2–3).Freund then sought to prove that in both cases, there was no cerebral speech disturbance in the sense of Lichtheim and Wernicke.



Das Krankheitsbild der

Apraxie

(„motorischen Asymbolie").

Auf Grund eines Falles von einseitiger Apraxie

dargestellt von

Dr. phil. et med. H. Liepmann
Assistenzarzt der städt. Irrenanstalt zu Dalldorf-Berlin.

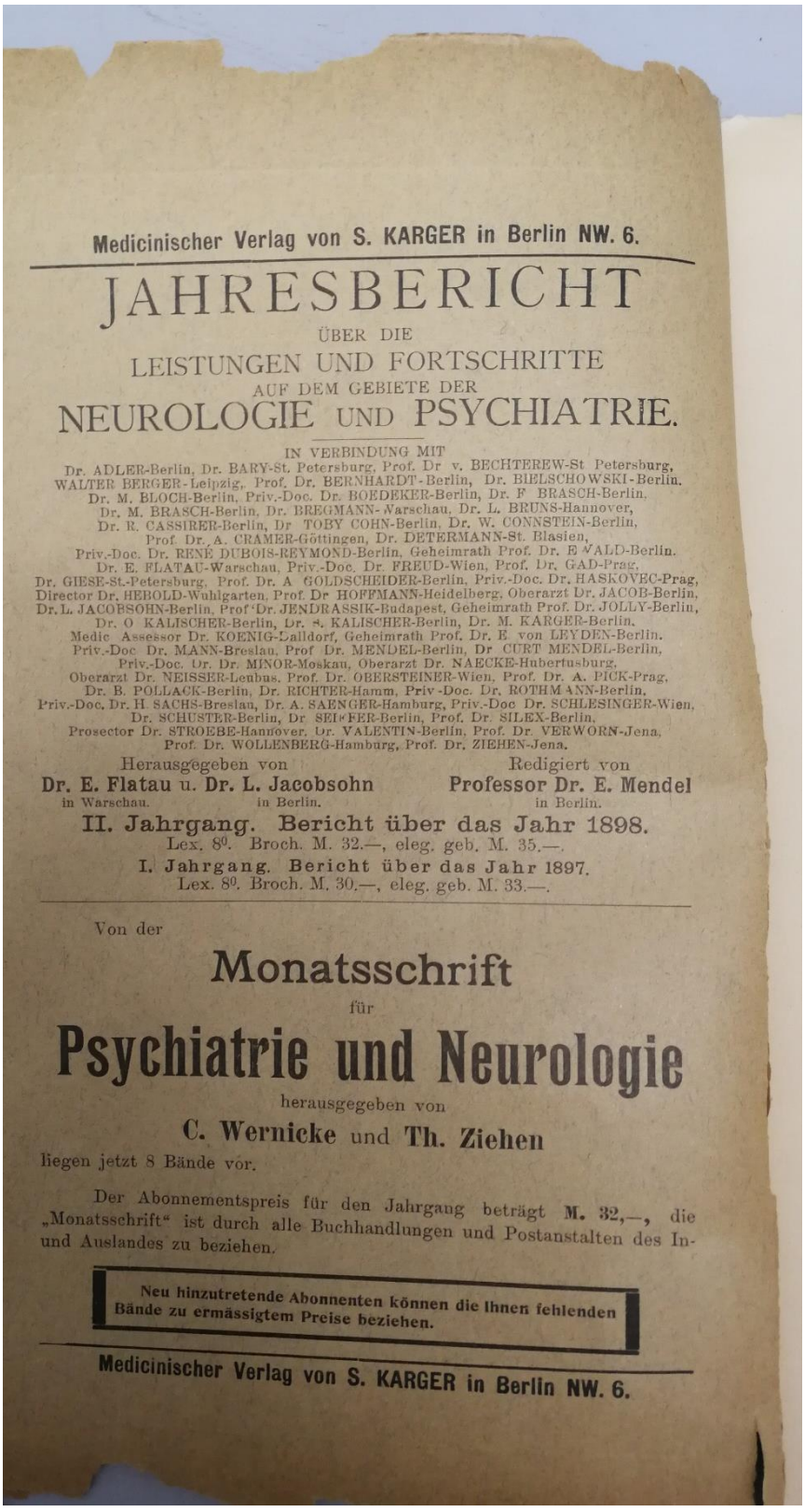
Mit 2 Abbildungen.

ALLZEIT VORAN
S. K.

BERLIN 1900.
VERLAG VON S. KARGER.
KARLSTRASSE 15.

Figure 41 . Das Krankeitsbild der Apraxie (motorischen Asymbolie) Kl.schr. 10726.

Source: Liepmann, Hugo (1900) *Das Krankeitsbild der Apraxie (motorischen Asymbolie).* Location: Central Library - *Universitätsbibliothek* Frankfurt.



Medicinischer Verlag von S. KARGER in Berlin NW. 6.

JAHRESBERICHT

ÜBER DIE

LEISTUNGEN UND FORTSCHRITTE

AUF DEM GEBIETE DER

NEUROLOGIE UND PSYCHIATRIE.

IN VERBINDUNG MIT

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Herausgegeben von
Dr. E. Flatau u. Dr. L. Jacobsohn
in Warschau. in Berlin.

Redigiert von
Professor Dr. E. Mendel
in Berlin.

II. Jahrgang. Bericht über das Jahr 1898.
Lex. 8°. Broch. M. 32.—, eleg. geb. M. 35.—.

I. Jahrgang. Bericht über das Jahr 1897.
Lex. 8°. Broch. M. 30.—, eleg. geb. M. 33.—.

Von der

Monatsschrift

für

Psychiatrie und Neurologie

herausgegeben von

C. Wernicke und **Th. Ziehen**

liegen jetzt 8 Bände vor.

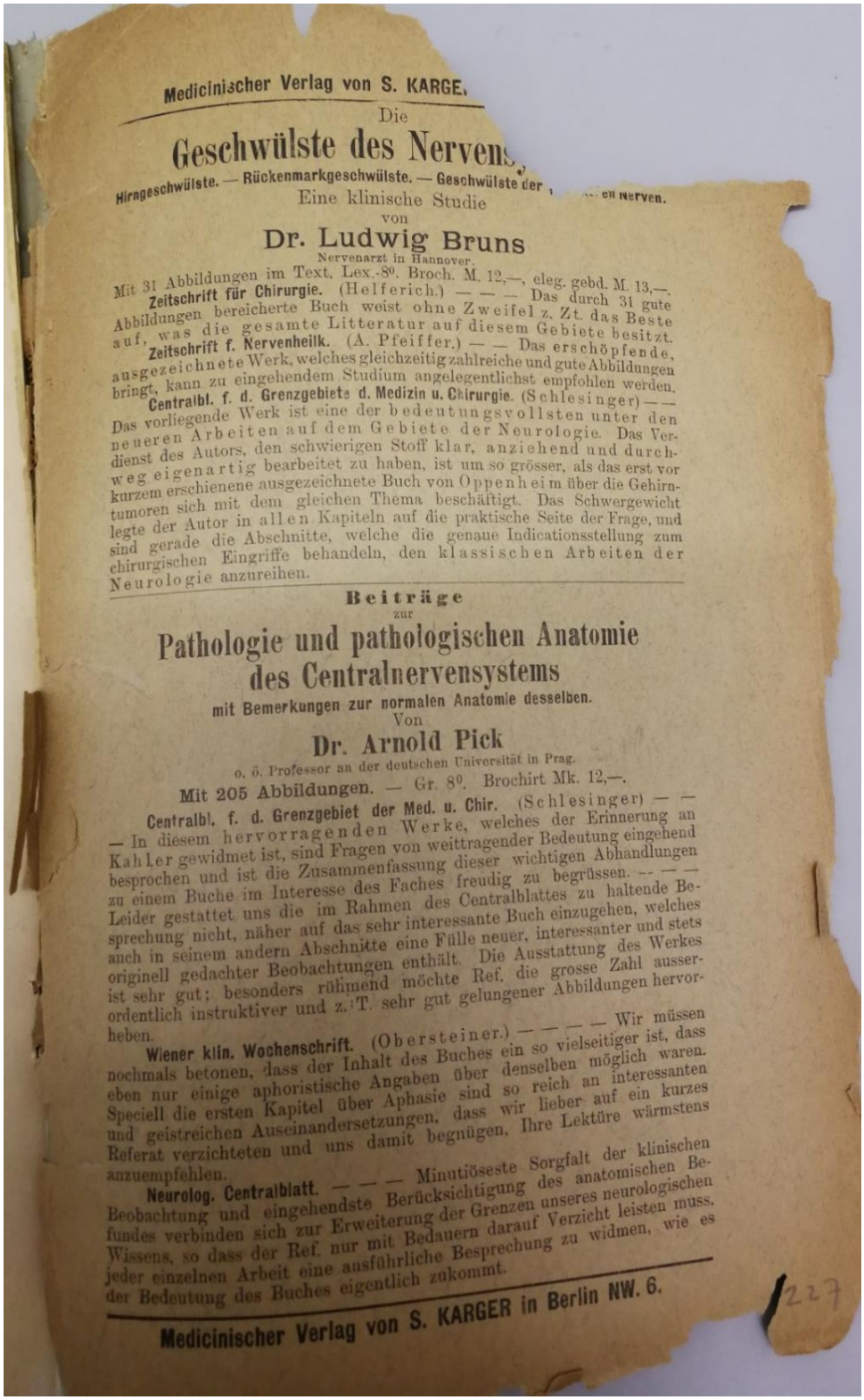
Der Abonnementspreis für den Jahrgang beträgt **M. 32,—**, die „Monatsschrift" ist durch alle Buchhandlungen und Postanstalten des In- und Auslandes zu beziehen.

Neu hinzutretende Abonnenten können die ihnen fehlenden Bände zu ermässigtem Preise beziehen.

Medicinischer Verlag von S. KARGER in Berlin NW. 6.

Figure 42. Das Krankeitsbild der Apraxie (motorischen Asymbolie) Kl.schr. 10726.

Source: Liepmann, Hugo (1900) *Das Krankeitsbild der Apraxie (motorischen Asymbolie)*. Location: Central Library - *Universitätsbibliothek* Frankfurt.



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Die

Geschwülste des Nervens

Hirngeschwülste. — Rückenmarkgeschwülste. — Geschwülste der ... en Nerven.

Eine klinische Studie

von

Dr. Ludwig Bruns

Nervenarzt in Hannover.

Mit 31 Abbildungen im Text. Lex.-8°. Broch. M. 12,—, eleg. gebd. M. 13,—.

Zeitschrift für Chirurgie. (Helferich.) — — — Das durch 31 gute Abbildungen bereicherte Buch weist ohne Zweifel z. Zt. das Beste auf, was die gesamte Litteratur auf diesem Gebiete besitzt.

Zeitschrift f. Nervenheilk. (A. Pfeiffer.) — — Das erschöpfende, ausgezeichnete Werk, welches gleichzeitig zahlreiche und gute Abbildungen bringt, kann zu eingehendem Studium angelegentlichst empfohlen werden.

Centralbl. f. d. Grenzgebiete d. Medizin u. Chirurgie. (Schlesinger) — — Das vorliegende Werk ist eine der bedeutungsvollsten unter den neueren Arbeiten auf dem Gebiete der Neurologie. Das Verdienst des Autors, den schwierigen Stoff klar, anziehend und durchweg eigenartig bearbeitet zu haben, ist um so grösser, als das erst vor kurzem erschienene ausgezeichnete Buch von Oppenheim über die Gehirntumoren sich mit dem gleichen Thema beschäftigt. Das Schwergewicht legte der Autor in allen Kapiteln auf die praktische Seite der Frage, und sind gerade die Abschnitte, welche die genaue Indicationsstellung zum chirurgischen Eingriffe behandeln, den klassischen Arbeiten der Neurologie anzureihen.

Beiträge

zur

Pathologie und pathologischen Anatomie des Centralnervensystems

mit Bemerkungen zur normalen Anatomie desselben.

Von

Dr. Arnold Pick

o. ö. Professor an der deutschen Universität in Prag.

Mit 205 Abbildungen. — Gr. 8°. Brochirt Mk. 12,—.

Centralbl. f. d. Grenzgebiet der Med. u. Chir. (Schlesinger) — — — In diesem hervorragenden Werke, welches der Erinnerung an Kahler gewidmet ist, sind Fragen von weittragender Bedeutung eingehend besprochen und ist die Zusammenfassung dieser wichtigen Abhandlungen zu einem Buche im Interesse des Faches freudig zu begrüssen. — — — Leider gestattet uns die im Rahmen des Centralblattes zu haltende Besprechung nicht, näher auf das sehr interessante Buch einzugehen, welches auch in seinem andern Abschnitte eine Fülle neuer, interessanter und stets originell gedachter Beobachtungen enthält. Die Ausstattung des Werkes ist sehr gut; besonders rühmend möchte Ref. die grosse Zahl ausserordentlich instruktiver und z. T. sehr gut gelungener Abbildungen hervorheben.

Wiener klin. Wochenschrift. (Obersteiner.) — — — — Wir müssen nochmals betonen, dass der Inhalt des Buches ein so vielseitiger ist, dass eben nur einige aphoristische Angaben über denselben möglich waren. Speciell die ersten Kapitel über Aphasie sind so reich an interessanten und geistreichen Auseinandersetzungen, dass wir lieber auf ein kurzes Referat verzichteten und uns damit begnügen, Ihre Lektüre wärmstens anzuempfehlen.

Neurolog. Centralblatt. — — — Minutiöseste Sorgfalt der klinischen Beobachtung und eingehendste Berücksichtigung des anatomischen Befundes verbinden sich zur Erweiterung der Grenzen unseres neurologischen Wissens, so dass der Ref. nur mit Bedauern darauf Verzicht leisten muss, jeder einzelnen Arbeit eine ausführliche Besprechung zu widmen, wie es der Bedeutung des Buches eigentlich zukommt.

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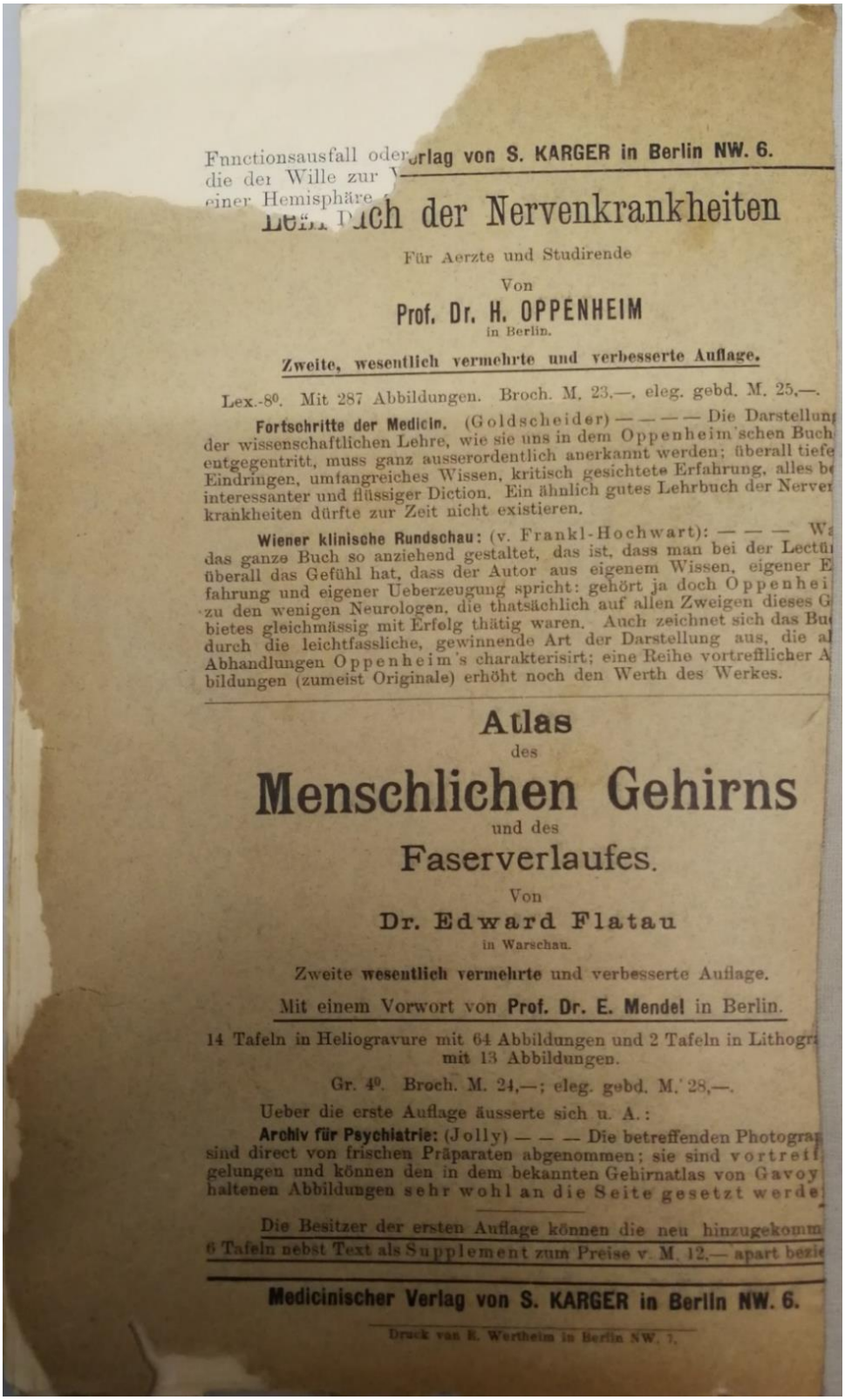
Figure 43 . Das Krankeitsbild der Apraxie (motorischen Asymbolie) Kl.schr. 10726.

Source: Liepmann, Hugo (1900) *Das Krankeitsbild der Apraxie (motorischen Asymbolie)*. Location: Central Library - *Universitätsbibliothek* Frankfurt.



Fnnctionsausfall oder
die der Wille zur V
einer Hemisphäre.

Verlag von S. KARGER in Berlin NW. 6.

Lehrbuch der Nervenkrankheiten

Für Aerzte und Studirende

Von

Prof. Dr. H. OPPENHEIM

in Berlin.

Zweite, wesentlich vermehrte und verbesserte Auflage.

Lex.-8°. Mit 287 Abbildungen. Broch. M. 23,—, eleg. gebd. M. 25,—.

Fortschritte der Medicin. (Goldscheider) — — — — Die Darstellung der wissenschaftlichen Lehre, wie sie uns in dem Oppenheim'schen Buch entgegentritt, muss ganz ausserordentlich anerkannt werden; überall tiefe Eindringen, umfangreiches Wissen, kritisch gesichtete Erfahrung, alles be interessanter und flüssiger Diction. Ein ähnlich gutes Lehrbuch der Nerven krankheiten dürfte zur Zeit nicht existieren.

Wiener klinische Rundschau: (v. Frankl-Hochwart): — — — Wa das ganze Buch so anziehend gestaltet, das ist, dass man bei der Lectü überall das Gefühl hat, dass der Autor aus eigenem Wissen, eigener E fahrung und eigener Ueberzeugung spricht: gehört ja doch Oppenhei zu den wenigen Neurologen, die thatsächlich auf allen Zweigen dieses G bietes gleichmässig mit Erfolg thätig waren. Auch zeichnet sich das Bu durch die leichtfassliche, gewinnende Art der Darstellung aus, die a Abhandlungen Oppenheim's charakterisirt; eine Reihe vortrefflicher A bildungen (zumeist Originale) erhöht noch den Werth des Werkes.

Atlas

des

Menschlichen Gehirns

und des

Faserverlaufes.

Von

Dr. Edward Flatau

in Warschau.

Zweite **wesentlich vermehrte** und verbesserte Auflage.

Mit einem Vorwort von **Prof. Dr. E. Mendel** in Berlin.

14 Tafeln in Heliogravure mit 64 Abbildungen und 2 Tafeln in Lithogr mit 13 Abbildungen.

Gr. 4°. Broch. M. 24,—; eleg. gebd. M. 28,—.

Ueber die erste Auflage äusserte sich u. A.:

Archiv für Psychiatrie: (Jolly) — — — Die betreffenden Photogra sind direct von frischen Präparaten abgenommen; sie sind vortref gelungen und können den in dem bekannten Gehirnatlas von Gavoy haltenen Abbildungen sehr wohl an die Seite gesetzt werde

Die Besitzer der ersten Auflage können die neu hinzugekomm 6 Tafeln nebst Text als Supplement zum Preise v. M. 12.— apart bezi

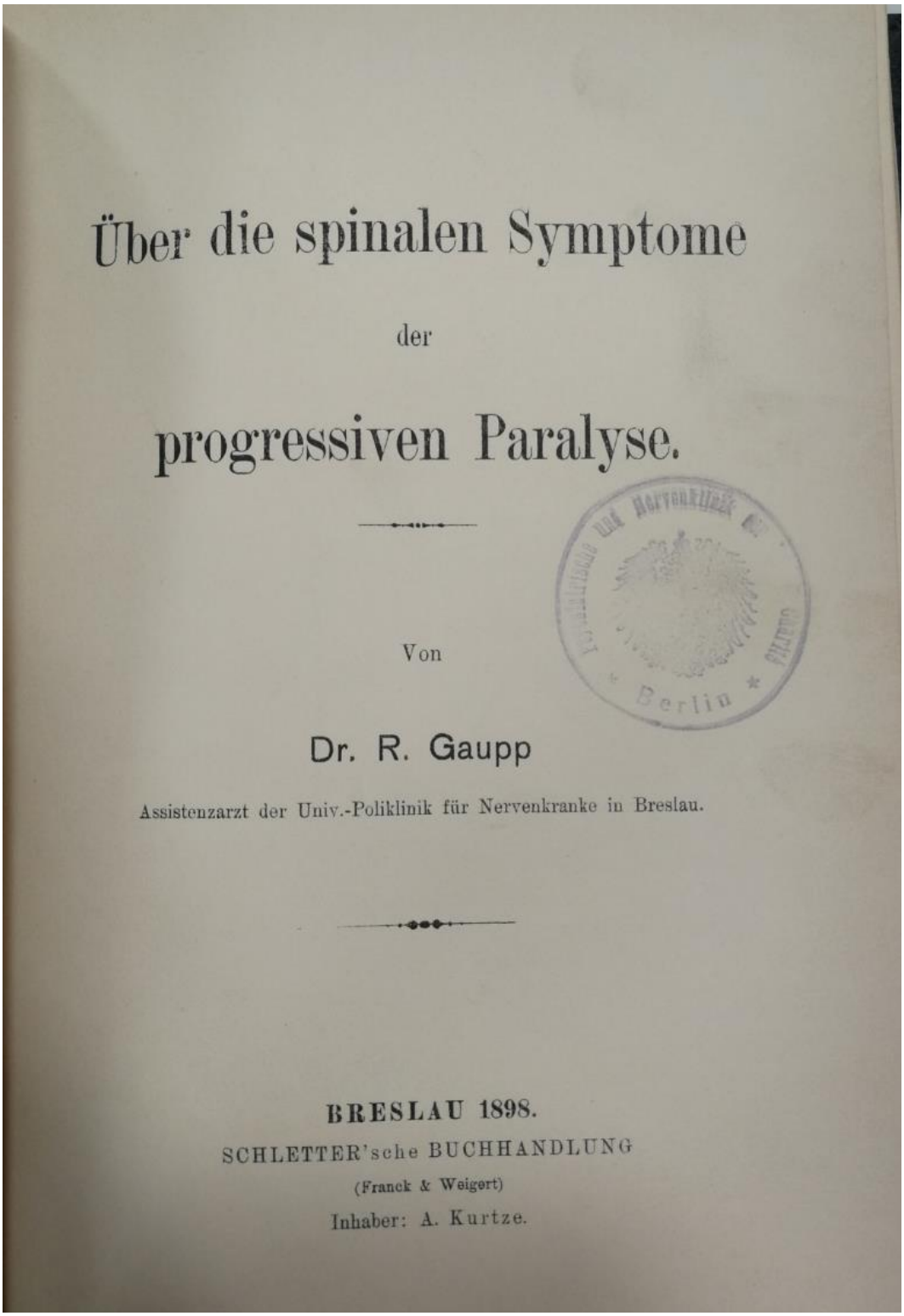
Medicinischer Verlag von S. KARGER in Berlin NW. 6.

Druck von E. Wertheim in Berlin NW. 7.

Figure 44 . Das Krankeitsbild der Apraxie (motorischen Asymbolie) Kl.schr. 10726.

Source: Liepmann, Hugo (1900) *Das Krankeitsbild der Apraxie (motorischen Asymbolie).* Location: Central Library - *Universitätsbibliothek* Frankfurt.

2.4.10 Robert Gaupp [1870–1953]



Über die spinalen Symptome

der

progressiven Paralyse.

Von

Dr. R. Gaupp

Assistenzarzt der Univ.-Poliklinik für Nervenkranke in Breslau.

BRESLAU 1898.

SCHLETTER'sche BUCHHANDLUNG

(Franck & Weigert)

Inhaber: A. Kurtze.

Figure 45. Über die spinalen Symptome der progressiven Paralyse.

Source: Gaupp, Robert Eugen (1898) *Über die spinalen Symptome der progressiven Paralyse.* Location: Location: Charité Medical Library.

Progressive paralysis is the most common and most important chronic mental illness (Gaupp, 1898: 1). Most of the time, it mentally afflicts completely healthy and fully developed people.

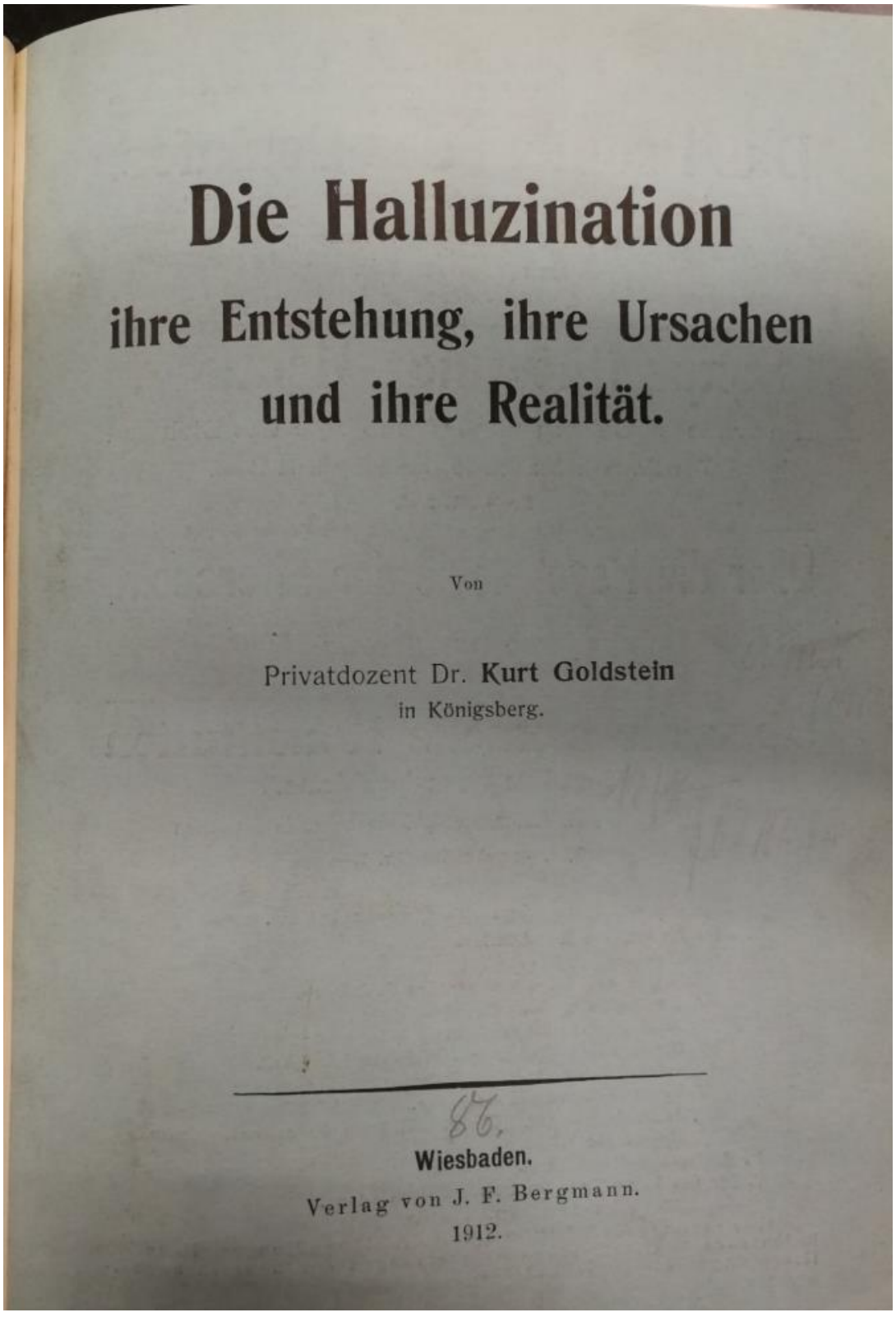
It is surprising that the early diagnosis of progressive paralysis has frequently been the subject of special treatises and that they are eager to establish specific, in all cases, untrue marks of the impending calamity (Gaupp, 1898: 1). This task appears more recently to be more difficult than before, as this particular form of paralysis, the purely demented form, the more frequent with the so-called classical mid-term importance, occurs in the background (Gaupp, 1898: 1). The consequence of this is that they (the psychiatrists and doctors) are used to looking for the first signs of suffering in physical areas, not to regard psychic anomalies as necessary.

The more the psychosis plays out only with the image of slowly progressive intelligence and civility, the more difficult it becomes, especially with a single examination of an unknown patient, to obtain a particular diagnosis from psychic behavior alone. Local conditions make this diagnosis more complicated, in regions like Breslau, for example, are disturbed by groups of mentally severely injured by excessive consumption of schnapps, a strong alcoholic drink (Gaupp, 1898: 1). The finding of a judgment and memory is weak, even if they have acquired a sickness. It is not enough to recognize him, but alcoholic dementia can almost paralyze the person with paralysis in specific stadiums.

2.4.11 Kurt Goldstein [1878–1965]

In the disciplines of neuropsychology and psychosomatics, this German-American neurologist and psychiatrist is regarded as a pioneer. Goldstein focused on psychiatry and neurology while studying under Carl Wernicke and Ludwig Edinger. Goldstein's father reluctantly agreed to let him attend Breslau University. Goldstein spent one semester at the University of Heidelberg before moving to Berlin, where he was able to study Neo-Kantian philosophy and literature and was introduced to Carl Wernicke's ideas. One year later, Goldstein went to Breslau to study medicine. Under the guidance of Carl Wernicke, Goldstein focused his research on neurology and psychiatry. Goldstein graduated from medical school at the age of 25. (Harrington, 2000). Ludwig Edinger invited Goldstein to the **Senckebergisches Neurologisches Institut at the University of Frankfurt am Main** in 1903, where he worked as Edinger's assistant from October 1903 until September 1904. Goldstein arrived in the United States of America in October 1934. He worked as a neurologist at the New York City Psychiatric Institute and established links with Columbia University. Between 1940 and 1945, Goldstein worked as a clinical professor of neurology in Boston.[21] In 1946, he returned to New York City and established a private practice.

[21] "Judy Duchan's “History of Speech - Language Pathology". *www.acsu.buffalo.edu*.. Accessed: 05.07.2019.



Die Halluzination

ihre Entstehung, ihre Ursachen und ihre Realität.

Von

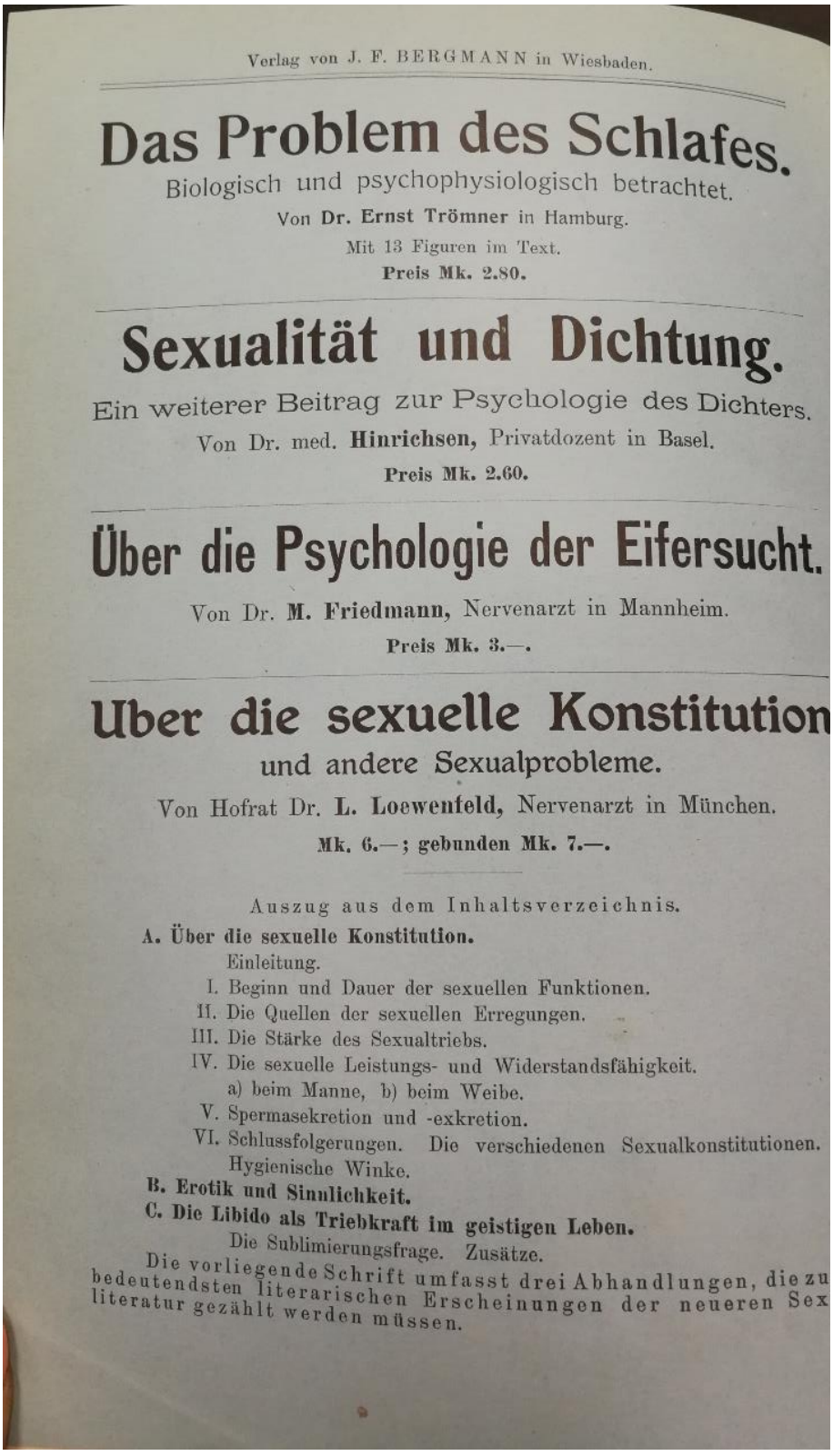
Privatdozent Dr. **Kurt Goldstein**
in Königsberg.

86.

Wiesbaden.
Verlag von J. F. Bergmann.
1912.

Figure 46. Kurt Goldstein . Die Halluzination ihre Entestehung, ihre Ursachen und ihre Realitat.

Source: Goldstein, Kurt (1912) *Die Halluzination ihre Entestehung, ihre Ursachen und ihre Realitat*. Location: Central Library - *Universitätsbibliothek* Frankfurt.



Verlag von J. F. BERGMANN in Wiesbaden.

Das Problem des Schlafes.

Biologisch und psychophysiologisch betrachtet.

Von **Dr. Ernst Trömner** in Hamburg.

Mit 13 Figuren im Text.

Preis Mk. 2.80.

Sexualität und Dichtung.

Ein weiterer Beitrag zur Psychologie des Dichters.

Von Dr. med. **Hinrichsen,** Privatdozent in Basel.

Preis Mk. 2.60.

Über die Psychologie der Eifersucht.

Von Dr. **M. Friedmann,** Nervenarzt in Mannheim.

Preis Mk. 3.—.

Uber die sexuelle Konstitution

und andere Sexualprobleme.

Von Hofrat Dr. **L. Loewenfeld,** Nervenarzt in München.

Mk. 6.—; gebunden Mk. 7.—.

Auszug aus dem Inhaltsverzeichnis.

A. Über die sexuelle Konstitution.

Einleitung.

I. Beginn und Dauer der sexuellen Funktionen.

II. Die Quellen der sexuellen Erregungen.

III. Die Stärke des Sexualtriebs.

IV. Die sexuelle Leistungs- und Widerstandsfähigkeit.

a) beim Manne, b) beim Weibe.

V. Spermasekretion und -exkretion.

VI. Schlussfolgerungen. Die verschiedenen Sexualkonstitutionen. Hygienische Winke.

B. Erotik und Sinnlichkeit.

C. Die Libido als Triebkraft im geistigen Leben.

Die Sublimierungsfrage. Zusätze.

Die vorliegende Schrift umfasst drei Abhandlungen, die zu bedeutendsten literarischen Erscheinungen der neueren Sex literatur gezählt werden müssen.

Figure 47. Die Halluzination ihre Entestehung, ihre Ursachen und ihre Realitat. Kurt Goldstein.

Source: Goldstein, Kurt (1912) *Die Halluzination ihre Entestehung, ihre Ursachen und ihre Realitat*. Location: Central Library - *Universitätsbibliothek* Frankfurt.

Thanks to the discoveries and research conducted, especially in Wrocław, the neurolinguistics could have been developed. Other scientists are more tightly connected to neuroscience; scientists shaped and led by Carl Wernicke can now be called the Breslau school of neurolinguistics.

2.5 Chapter conclusions

Scientists from Breslau participated in German and world psychiatry, and their views influenced the shape of neurolinguistics. Today - from the perspective of the entire century that has passed since the German doctor's, Carl Wernicke's, death - one can confidently make a thesis about his scientific achievements' universal dimension. He was not only a psychiatrist, neurologist but also an anatomist, pathologist, and neuropathologist. Wernicke was an individualist who was scientifically far ahead of his time and was a model for representatives of several medicine fields. The thesis's main objective is the recognition and recall of information on a group of researchers – Carl Wernicke's students.

The researchers' selected profiles were presented, and their achievements in brain research and neuroscience in Breslau and other cities were acknowledged. The research conducted by German doctors from which neurolinguistics emerged shows how psychiatry, psychology, and neurology are tightly connected and dependent on each other. The materials found in Wrocław, Berlin, and Frankfurt am Main are of great importance and help list the scientists whose discoveries led to the development of neurolinguistics.

The development of modern psychiatry, with its greatest accomplishments, took place between the second half of the nineteenth century and the beginning of the twentieth century, with Wrocław serving as one of the most important research centers. Alois Alzheimer, Henrich Neumann, Carl Wernicke, Karl Bonhoeffer This is particularly true of H. Neumann and his student Carl Wernicke, who is credited with founding the Wrocław school of neuropsychiatry. Orfried Foerster, the founder of the German school of neurosurgery, Karl Heibronner, later

professor of psychiatry in Utrecht, or Hugo Liepmann, professor of psychiatry and neurology in Berlin. Professor Alzheimer's untimely death prevented him from reacting to the big plans he had for his new job as director of the Wrocław Clinic of Psychiatric and Nervous Diseases. The clinic's structure was heavily damaged during the war. A great deal of important evidence has been lost. On the other hand, there was a total rejection of the links with the tradition of German psychiatry in Wrocław in the traumatic consciousness of the generation that survived the war, which further blurred many significant historical details.

The table below contains an overview of researchers, their education, and their major accomplishments.

Table 4. Breslau School of neurolinguistics – summary.

Heinrich Neumann [1814–1884]
Education: *Universität* Breslau. **Institutions:** All Saints' Hospital (in German: Allerheiligen-Hospital) in Breslau, Irrenheilanstalt in Leubus. **Research and achievements: -** The first outstanding figure in Breslau's psychiatry. A creator of the concept of "one psychosis".
Carl Wernicke [1848–1905]
Education: *Universität* Breslau. **Institutions:** All Saints' Hospital in Breslau. Charité academic hospital in Berlin, *Universität* Breslau, University of Halle. **Research and achievements:** Wernicke's Aphasia.

Otfrid Foerster [1873–1941]

Education: *Universität* Breslau.

Institutions: *Universität* Breslau, University Psychiatric Clinic,Wenzel-Hancke Krankenhaus.

Research and achievements: developed an operational method of treating epilepsy.

Karl Heilbronner [1869–1914]

Education: Ludwig and Maximilian University in Munich.

Institutions: *Senckenberg Institute* in Frankfurt am Main, Department of Psychiatry and Nervous Diseases in Breslau, University of Halle.

Research and achievements: separation of psychiatry and neurology is not possible.

Karl Bonhoeffer [1868–1948]

Education: *Universität* Breslau.

Institutions: Heidenheim an der Brenz, became the head of a psychiatric clinic and an observation station for “mentally ill criminals” in Breslau, Königsberg, Heidelberg, *Universität* Breslau and Charité Hospital.

Alois Alzheimer [1864–1915]

Education: Berlin, Tübingen and Würzburg.

Institutions: a psychiatric institution (in German: Städtische Anstalt für Irre und Epileptische) in Frankfurt am Main, the head of the Department of Psychiatry at the University of Breslau and the director of a psychiatric clinic

Research and achievements: Alzheimer's disease.

Oswald Bumke [1877–1950]

Education: Universities in Freiburg, Leipzig, Munich and Halle.

Institutions: the University of Breslau, a mental hospital in Freiburg.

Research and achievements: research on dementia, an advocate of the concept of psychiatry and neurology being combined into one subject at universities.

Edmund Forster [1878–1933]

Education: Université de Strasbourg.

Institutions: Berlin University Hospital Charité, Pasewalk.

Research and achievements: diagnosed Hitler with psychosis.

Hugo Liepmann [1863–1927]
Education: The Universities of Freiburg and Leipzig. **Institutions:** The psychiatric clinic at Breslau, head physician at Dalldorf (Berlin-Wittenau). **Research and achievements:** research on apraxia.
Robert Gaupp [1870–1953]
Institutions: the University of Breslau, Universities of Heidelberg and Munich**.** **Research and achievements:** research on relations between personality and psychosis**.**
Kurt Goldstein [1878 – 1965]
Education: *Universität* Breslau and the University of Heidelberg. **Institutions:** the University of Breslau, University of Heidelberg, Senckebergisches Neurologisches Institut at the University of Frankfurt, the Psychiatric Institute in New York, Columbia University in New York. **Research and achievements:** research on schizophrenia and war trauma.

Wrocław is a fascinating research subject because of its past and recent changes. The facility's foundation was severely damaged during the war. Several important records have been shredded. The Charité Medical Humanities (Bibliothek für Geschichte der Medizin und Soziale Medicine) in Berlin has another set of source texts. The Library of History of Medicine and Social Medicine, also known as the "Library Medical Humanities," is a branch of the Charité Medical Library that

houses Charité Centrum's specialist literature. The Association of Medical History and Related Libraries is a member of the library. In 1865, the Berlin Charité Hospital founded the first separate wards for neurological patients, which marked a turning point in German neurology. Carl Wernicke, served at the Charité academic hospital's psychiatry clinic from 1876 to 1878, and Karl Bonhoeffer, succeeded Theodor Ziehen [1862–1950] as a full professor of psychiatry and neurology at the University of Berlin and was a director of the university clinic of psychiatry and neurology at the Charité Hospital.

Another collection of materials comes from the Goethe University of Frankfurt's Frankfurt University Library [German: *Universitätsbibliothek* Frankfurt am Main or *Universitätsbibliothek* Johann Christian Senckenberg]. It began as a town library in the 15th century. Johann Wolfgang Goethe University in Frankfurt (German Johann Wolfgang Goethe-*Universität* Frankfurt am Main), also known as the University of Frankfurt, was established in 1914 in Frankfurt am Main and named in 1932 after Johann Wolfgang Goethe [1749–1832], the city's most famous inhabitant. Academic neurolinguistics can be traced back to the history of psychiatry as a medical specialty from which neurology originated, as well as the scientific accomplishments of its first members in Breslau.

3 Selected linguistic disorders and issues with the communication - an overview

Different types of disorders influence how the world is viewed, for instance, autism, a lifelong developmental disability that affects how a person communicates with and relates to other people. Whereas, other diseases influence communication: dysarthria, Tourette syndrome, Alzheimer's disease, or other rare neurological disorders. This section presents the communication and the main issues resulting from linguistic disorders. Each of the linguistic disorders is briefly defined with the treatments described. This section aims to present linguistic disorders and neurodegenerative diseases as causes of difficulties with communication. Various categories of disorders affect viewing the world and communication. For example, Autism, Alzheimer's disease, or Tourette syndrome are lifelong developmental disabilities that affect how a person interacts with others. The first part of this section covers an overview of communication. The second part describes neurodegenerative diseases. The last part covers rare neurological disorders that affect communication.

Neurodegenerative diseases are a category of nervous system congenital or acquired progressive diseases in which nerve cell failure is the prominent pathological feature. Besides Alzheimer's and Parkinson's disease, multiple sclerosis (MS) is one of the most common neurodegenerative diseases. One of the signs of Multiple sclerosis are communication and speech problems. Dysarthria is a medical term describing problems with a speech in patients. This section discusses how neurolinguistics explains the neural processes in the human brain that regulate understanding, development, and acquisition of a language from a linguistic perspective.

3.1 Communication

Communication accompanies humans at all times. It is essential in attending to the most mundane matters, and it is hard to imagine functioning efficiently without communication. While it is the most sophisticated between humans, all creatures can communicate, using body language, scents, or colors. That does not mean that communication between animals is worse, it just means that it varies. However, there are many situations in which the ability to communicate can be lost, for instance, due to neurodegenerative diseases such as Parkinson's disease, vascular diseases, or the most common cause of dementia in recent years - Alzheimer's disease.

In the study of communication, two primary schools see communication as the transmission of messages and as the sharing and dissemination of meanings. As per John Fiske ([1982] 2003: 3), in the scholarly sense of the term, communication is not a topic; however, a multidisciplinary field of research. It is assumed that signs and codes are involved in all communication. Of the two fundamental schools in the study of communication, one sees contact as the processing of messages. It is about using communication by senders and performance, precision, and seeing communication as a mechanism by which one person affects another person's state of mind (Fiske, 2003: 2). Communication is seen as the creation and exchange of meanings in the second school; it is concerned with how messages or texts communicate with people to create meanings; that is, it concerns the role of texts in our culture (Fiske, 2003: 2). It is important to express an appreciation of the world's viewpoint to interact correctly. Therefore, in the same text, readers with distinct social experiences or different cultures can find different meanings.

An inseparable feature of culture is communication. Moreover, it can be seen that culture is a code that individuals learn and exchange, involving communication. Besides, communication includes every cultural pattern and every single act of social action; hence, culture cannot be understood without a communication analysis, and communication cannot be understood without an

understanding of the culture at the same time (Duszak, 1998: 262). A language can influence other languages due to communication.

When more evolved groups emerge in a primitive culture, the superior group becomes the dominant population through modern tools and innovations, and their language becomes superior to the other population. For instance, the Celts were technologically advanced and superior to the less evolved and more primitive British Isles population (Wójcik, 2015: 182). The Celts started to trade between the tribes and the European continent, but because of substantial similarity between their languages, interactions with neighboring people on the islands were the most straightforward (Wójcik, 2015: 182). Direct communication occurs when the real intentions are made known in the verbal communications; indirect communication, on the other hand, when the real intentions in the entire communication process are unclear. Moreover, because of language disorders described in the next section that come from neurodegenerative diseases, communication can be ambiguous.

3.2 Neurodegenerative diseases and speech problems

Neurolinguistics studies the correlation between language and the brain and how brain damage influences communication. Such a disease as multiple sclerosis can cause permanent damage or deterioration of the nerves. From the anatomical and linguistic perspective, the description of proper speech production is necessary to explain the problems associated with language disorders (Gatkowska, 2012: 10). The language production begins with the formation of an utterance, i.e., the selection of words, sentence construction, and grammatical adjustment of the word forms that make up the sentence, followed by the implementation stage, i.e., the spoken words and sentences Gatkowska, 2012: 13). From the neurophysiological point of view, the implementation will result in finding motor engrams to implement appropriate sounds and combinations, further building grammatical forms of words, and constructing more complex complexes, such as groups of words, sentences, or utterances.

The formulation phase of speech is made possible by nervous processes called speech programming mechanisms. The speech realization phase is possible thanks to the mechanisms of the speech executive sphere, which are responsible for: phonations, articulations, and prosodies (intonations, rhythm, speech rate). Dysarthria is a symptom of disturbances in realizing the speech process with a neurological background. Understanding of speech and word resources, the functioning of sematic memory remains unchanged (unless dysarthria is accompanied by other changes, e.g., aphasia or dementia, which are the source of problems with understanding, focusing attention, planning, and producing speech).

Pathological changes inherent in dysarthria include the realization of speech, and in particular, affect its following aspects: they distort the articulation, they can cause pathological changes in the oral and nasal values of the realized voice, causing changes in the prosodic elements of the language, such as intonation, accent, accelerated speech rate (it may be, slowed down or variable), which is often accompanied by shorter phonation time (voice production), there may be respiratory changes (shortness of breath, loud inhalation, exhalation) and voice changes (volume, qualitative changes: voice hoarse, dull, soft or devoid of sound). The correct articulation of speech sounds involves the tongue, lips, mandible, palate, larynx, and respiratory muscles (Gatkowka, 2012: 14). The most critical links in the implementation sphere of language are articulating organs, which have a fundamental role in implementing speech. The majority of the sounds made by a human being depend on the tongue movements, efficiency, and settings.

The quality of the consonants depends on the tension of the lips. The realization of vowel sounds depends on the degree of opening the lips. The palate has a vital role in the sound’s quality, while the phonation (production of the speech sounds) depends on the vocal folds, larynx, movement, and tension of the respiratory muscles. Prosodic elements express the speaker's intentions, and they allow the listener to understand the utterance (Gatkowska, 2012: 17). To summarize, dysarthria is the inability to express oneself clearly, it impairs the ability to produce articulated speech sounds due to disturbance of neural mechanisms responsible for speech formation (Gatkowska, 2012: 19). Aphasia, on

the other hand, can be characterized by auditory perception and repetition greatly disrupted in pure word deafness, since the auditory input into the center for the sound pattern of words was disturbed. Spontaneous sounds, reading, and writing, on the other hand, are intact, as it does not affect the centers and pathways involved in these functions (Caplan, [1987] 2003: 145). Auditory understanding and repetition, and spontaneous speech are impaired by an injury to the Wernicke's area because word sounds are evoked in speech preparation.

The foundation for a neurological diagnosis, not only for neurolinguistics but also for a great deal of general neuropsychology, is that the individual components of a language processing system can be found in various brain regions. The late 19th and early 20th centuries saw enormous developments in detecting clinical symptoms of neurological disorders in the those egions (Caplan, [1987] 2003: 139). The elemental manifestations of diseases such as multiple sclerosis, stroke, epilepsy, and degenerative nervous system disease were identified during this time, and the relationship was first established between clinical symptoms and the location of lesions in the neuraxis (Caplan, [1987] 2003: 140). For around 75-100 years, this era of clinically derived neuroscience continued. By the Second World War, the key developments were made in the clinical explanation of illness and the inferences from clinical findings of how the nervous system controlled the sensory-motor function. The tremendous developments in human understanding of the healthy nervous system and nervous system disorders that have arisen since about that time (many were also made before the Second World War) have resulted from clinical findings and laboratory experiments (Caplan, [1987] 2003: 140). The finding that myasthenia gravis is an immunological condition affecting post-synaptic cholinergic receptors, not a muscle dysfunction itself or the release of acetylcholine packets pre-synoptically, is the product of laboratory research. Without recourse to laboratory studies, the essence of this disease, and many others, would have been impossible to determine. There was a comparable tradition of linguistic aphasiology and neurolinguistic theory. Approximately 100 years of clinically-derived analyses and hypotheses have just been reviewed. The most remarkable fact about this is how much such basic observational methods

have accomplished. However, a clinical observation will undoubtedly continue to bring new insights into these fields (Caplan, [1987] 2003: 140). Wernicke noted that the found speech abnormalities were distinct in these two syndromes. Broca's patients were either barely able to talk or did not talk at all. Wernicke's first patient had a fluent speech riddled with phonemic paraphasia and jargon. These variations as well as the "relatively clear understanding" found in Broca's aphasia were part of the database on which the diagnosis of Broca's or Wernicke's aphasia was made. These qualitative features of the classical syndromes were identified in more detail in subsequent studies.

A variety of abnormalities in these two syndromes became noticeable to pursue the symptoms of Broca's and Wernicke's aphasia. Several decreases in speech production have been taken into consideration as other potential manifestations of Broca's aphasia. Phonemic paraphasias, semantic paraphasias, unrecognizable fragments called "neologisms", seriously disordered and unrecognizable speech called "jargon", trouble in forming nouns known as "anomia", and others were included in the speech disorders in Wernicke's aphasia. The early realization that multiple patients may have qualitatively different speech disturbances gave rise to recognizing a reasonably large number of speech defects that could be found in each type of aphasia. In all classical aphasic syndromes, the same approach has existed for all language functions. The basis for explanations of the linguistic disorders in aphasia were these findings of the existence of qualitative language disruptions. These linguistic findings have, to some degree, had a role in the classification system (Caplan, [1987] 2003: 148). Thus, it was possible to recognize Wernicke's aphasia not only based on the patient's impaired understanding, repetition, and spontaneous expression but also because of the essence of his or her irregular speech, which had the characteristics that have just been mentioned.

There are also language disorders related to cortical white matter diseases (Murdoch, [1990] 2013: 202). Several studies revealed that disruption of cerebral white matter, that can occur in conditions such as subcortical strokes or as a consequence of demyelinating disorders (e.g., multiple sclerosis), may cause

language difficulties by disconnecting deep brain structures (e.g., basal ganglia) from cerebral cortex language areas. White matter pathways or connections allow contact between subcortical brain structures and the cerebral cortex, not just between the cerebral cortex's language centers (Murdoch, [1990] 2013: 202). Consequently, cortical interactions are not only crucial in language processing, but cortical-subcortical and subcortical-subcortical white matter pathways are also essential for the normal functioning of language.

Since modern models of subcortical involvement in language have suggested roles for structures such as the basal ganglia, thalamus, and subthalamic nucleus, the contact of these structures with the cerebral cortex through essential pathways of white matter has also been emphasized. Indirect effects of subcortical dysfunction on language areas of the cortex have been suggested as a potential explanation for language deficits following subcortical vascular lesions. Distance effect mechanisms have been suggested, including the influences of mass effect and edema, cortical ischaernia, and cortical hypometabolism, which inactivate the cortical language areas, which triggers a disconnection effect and consequently impair the language (Murdoch, [1990] 2013: 202). It has been proposed that essential white matter pathways must be accessible between the subcortical structures and the cortex, between various cortical regions, and between the subcortical structures, for information to be transmitted for language processing (Murdoch, [1990] 2013: 203). Researchers have proposed that the white matter pathways are crucial for allowing cortical and subcortical structures to function together in a connected, communicative framework, rather than suggesting a single cortical or subcortical structure as solely responsible for a particular language phase. Therefore, damage can result in irregular balances of inhibitory and excitatory influences anywhere in the pathway circuitry, thus impairing language processing.

Neurodegenerative conditions are devastating for the patients and the individuals around them. For instance, in both declarative states, Alzheimer’s disease development is followed by a more significant deficiency. In addition to undermining thought, abstraction, and vocabulary, there is an occurrence of

troubling behavioral disorders, including anxiety and extreme emotionality, aggression, and wandering, and non-declarative memory domains[22](Dominguez, 58). The mechanism leading to the appearance of neurodegenerative disease symptoms starts much earlier and has long been asymptomatic (often for years). When many neurons are injured, or the damage affects a particular part of the central nervous system, the first signs occur.[23]

3.2.1 Multiple sclerosis

This section presents symptoms and main indications of multiple sclerosis. Firstly, the causes of multiple sclerosis are described. Although the cause of MS remains unknown, according to research, a combination of factors can be involved. The first group to be described are immunological causes. It is currently assumed that MS is associated with an autoimmune process - an abnormal reaction of the immune system against the central nervous system, i.e., the brain, spinal cord, and visual nerves. The antigen that causes the cells of the immune system to attack is unknown. In recent years, however, scientists managed to identify cells that trigger an attack, learn about some of the triggers, and recognize specific receptors in the attacking cells that attract them to myelin Groetzinger,[2008] 2009: 32–34). Destruction of myelin – the substance that surrounds and insulates the nerve fibers, and the destruction of the fibers themselves, causes the transmission of nerve impulses to slow down or stop, which in turn causes the symptoms of MS.

Furthermore, environmental aspects can as well have an impact on the development of MS. Migration and Epidemiology Research – taking into consideration geographic and socio-economic differences, genetic and other factors – shows that people under the age of fifteen, born in the region of the world where a higher risk of developing MS exists, when moving out to a lower risk

[22] Phosphodiesterase Inhibition to Target the Synaptic Dysfunction in Alzheimer's disease Kelly R. Bales, Niels Plath, Niels Svenstrup, and Frank S. Menniti in Celia Dominguez - Neurodegenerative Diseases
[23] Kenneth Kaitin, Christopher Milne. *Schizofrenia koncernów.* "*Świat Nauki".* nr. 9 (241), p. 18, September 2011. Prószyński Media.

region, become as vulnerable to MS as other people living in that region. These data suggest that some environmental factors may be involved, operating before puberty, influencing the disease's possible later development. It is known that MS occurs more frequently in rural areas away from the equator. Some scientists believe it may be related to vitamin D that the human body produces when exposed to sunlight. People who live near the equator can benefit from the sunny weather all year round (Groetzinger,[2008] 2009: 32–34). As a result, higher amounts of vitamin D in their bodies are believed to benefit the immune system and prevent autoimmune diseases such as MS.

Another factor causing MS can be infection. People are exposed to various viruses, bacteria, and other microbes since childhood, which can cause demyelination and inflammatory responses. A virus or other infectious agent may result in the development of MS. Over a dozen viruses and bacteria have been studied, including measles, distemper, human herpesvirus type 6, Epstein-Barr virus, and the bacteria responsible for pneumonia, to check whether they affect MS (Groetzinger,[2008] 2009: 32–34). However, so far, none of them have been successful proven to be able to cause MS.

Last aspect to describe is genetics. While MS is not hereditary, it is a first-degree relationship to someone suffering from MS that raises the risk of developing the disease several times above the general population level. Some studies show that in communities with higher rates of the disease, specific genes show up more often. Additionally, in families where more than one person became ill, the factor can be recognized as genetic. Some scientists have formulated the theory that MS develops because people are born genetically predisposed to respond to an environmental factor that triggers an immune system's response (Groetzinger,[2008] 2009: 32–34). Perhaps this process requires one or more triggers for MS to arise; thus, a whole series of unfortunate events, on the principle that “everything went wrong”. Advanced techniques for gene identification can help answer the question about their role in developing MS.

3.2.1.1 Selected language disorders in multiple sclerosis

Selected language disorders can occur in multiple sclerosis. Dysarthria and aphasia are amongst the most often occurring disorders in patients with MS. Dysarthria has different effects on the course of various neurological diseases. Dysarthria can appear in the course of various neurological diseases, such as dementia.

When a dysarthria patient cannot make precise movements, his or her phonetic system is significantly distorted, sometimes reduced. In the case of Amyotrophic Lateral Sclerosis in the terminal stage of the bulbar variety, the patient does not perform any significant language movements; his or her speech is reduced to a short speech phonation, which does not require any tongue movements. The patient's speech then becomes completely incomprehensible (Gatkowska, 2012: 26). Patients with dysarthria also have difficulties with making the lips work properly because the muscle tone weakens (Gatkowska, 2012: 27). Phonetic changes in dysarthria also concern aphasia-type speech disorders. Since aphasia with its destructive influence affects all levels of language, the patient with aphasia has problems both at the level of realization of individual sounds and at the level of prosodic elements. Moreover, in a patient with dysarthria, phonation is often shortened, as the patient cannot properly manage the air due to the reduction in muscle tone (Gatkowska, 2012: 28). A short phonation time causes anxiety on both sides, both the patient and the listener, and is not conducive to social communication (Gatkowska, 2012: 29). Disturbances in intonation and accent can occur as well (Gatkowska, 2012: 30). There is often monotony, lack of accentuation, reduced volume, and accelerated speech rate.

3.2.1.2 Dysarthria

Dysarthria can take many forms in the course of MS for instance of an atactic dysarthria. Atactic dysarthria is characterized by a lack of coordination in the movements of articulation organs such as the tongue and lips, an inexplicable articulation that intensifies under the influence of emotions, excessive breaks in

articulation, phoneme stretching, inter-word breaks as well as variable speech speed, slow, non-rhythmic, no differentiation in accentuation and intonation, i.e., prosodic changes in speech, tendencies to separate syllables, loud, regular and sometimes explosive speech (Gatkowska, 2012: 91). It is worth bearing in mind that the picture of speech disorders will change with the disease's progression and the medications used in the same patient. Therefore, a reliable, accurate diagnosis of dysarthria will be determined by the trends of changes, the dynamics of their course, and new phenomena noted in the patient's speech (Gatkowska, 2012: 103). A thorough examination of the neurological disease and correct diagnosis may help resolve the ambiguous neurological picture.

Until recently, studies in multiple sclerosis on communication issues appeared to focus on the motor features of speech rather than the potential language problems arising from demyelination of subcortical white matter. Cognitive-linguistic abilities have historically been considered to be a feature of the cerebral cortex, and it was thus believed that it was impossible to impair these abilities in white matter disorders (Murdoch, [1990] 2013: 204). However, it is becoming increasingly evident that the role of white matter pathways and subcortical structures in both cognitive and language functions may have been overlooked.

Scientists now believe that in multiple sclerosis, disturbance of subcortical and brainstem impacting the cerebral cortex could be responsible for cortical dysfunction, contributing in this population to cognitive and linguistic disorders (Murdoch, [1990] 2013: 204). In the language function, neural white matter pathways connecting subcortical structures such as the basal ganglia and thalamus to cortical language areas have been considered significant. It is understood that cognitive impairments following multiple sclerosis cover the whole spectrum and include memory, intelligence, information processing, logical and intellectual thought, and attention deficits. Similarly, individuals with multiple sclerosis have been shown to demonstrate language deficiencies in the naming areas, comprehension of logical or grammatical constructions, word fluency, verbal reasoning, word meanings, and the perception of absurdities, ambiguities, and metaphors in studies where suitable and sufficiently sensitive language

assessments have been used (Murdoch, [1990] 2013: 204). Oral articulation entails a group of modifications secondary to nervous system lesions due to muscle function disruption.

In multiple studies, the prevalence of dysarthria in MS is between 23 and 51 percent, and it is graded as either spastic, ataxic, or mixed. In general, speech changes such as hypernasality, vocal harshness, insufficient tone level, and decreased amplitude regulation are displayed by patients with MS. Approximately 35 percent of patients have reduced vital abilities, and 42 percent have insufficient ventilation (Al-Araji and Oger, 2006: 81). In fundamental motor speech processes, therapeutic treatments include implementing techniques to address difficulties in articulation, phonation, resonance, prosody, and respiration, with the primary goal of enhancing the overall capabilities of the patient with MS.

In MS, aphasia occurs less often than dysarthria and may be acute or chronic. Chronic aphasia is more common in progressive MS, seen in about 0.7% to 1% of patients, compared to acute aphasia, which is more common in RR-MS in about 0.81% of cases. In 36 percent of acute aphasia patients, aphasia was the initial symptom, and it has a strong prognosis for recovery, at the order of 64 to 72.7 percent (Al-Araji and Oger, 2006: 81).

3.2.1.3 Treating speech problems in multiple sclerosis

Speech therapy can help patients with multiple sclerosis experiencing difficulties with speaking, including dysarthria or aphasia. The role of therapy is vital. Correctly, conscientiously, and systematically performed exercises not only bring improvement in speech. From a psychological point of view, improving the state of speech often gives meaning to everyday existence (Gatkowska: 2012: 107). MS sometimes causes several types of speech impairments, ranging from minor anomalies to severe speech problems that prevent third parties from understanding what people are saying. In such a case, it is worth using the help of speech therapists. There are also devices on the market that help with severe speech

disorders (Groetzinger,[2008] 2009: 28). Gatkowska (2012: 11) points to the role of speech therapy carried out professionally, adapted to the individual health condition, the progression of the neurological disease, and the patient's needs and possibilities.

Disturbances in the functioning of the lips, tongue, or jaw may impact speech by interfering with either the phrasing and loudness of breath control or the ability to voice and pronounce sounds. Speech therapy focuses on increasing the ability to communicate effectively. Changing the speaking rate or phrasing of sentences may be involved (Schapiro, 2003: 51). For the best possible sound production, suggestions are offered about the positioning of the lips, tongue, or jaw. A bare pacing board, composed of a pattern of rectangles set next to each other, can slow the individual's speech and enhance intelligibility. While uttering a single syllable, the individual points to each square. A pacing board can be simple, effective, and affordable (Schapiro, 2003: 51). Tremor can make it difficult to talk in certain circumstances; in such a case, alternate communication devices need to be used. None of these methods remove the tremor issues. The purpose is a continuous function, which can also be done by integrating both of these therapies (Schapiro, 2003: 51). The ayurvedic herbs such as Bacopa Monniera and Centella Asiatica and the European herb Salvia lavandulaefolia can enhance cognitive function. The narcotic herb Cannabis sativa is now attracting significant attention in treating multiple sclerosis in the future. It is doubtful, however, that any products from this plant would be readily available as non-prescription products (Oken, 2004: 21). Massage and other bodywork types can help cope with stress and the secondary muscle tension induced by the alteration of posture and equipment such as wheelchairs, braces, and crutches.

As some stress is produced by the therapeutic massage, its strength and length must be assessed not to worsen the disease. The systematic analysis of clinical trials using CAM in multiple sclerosis by Huntley and Ernst found evidence that massage enhanced patients' depression, anxiety, and self-esteem issues and called for further investigation in the form of comprehensive large-scale massage studies. A controlled study of 20 multiple sclerosis patients who

underwent eight Feldenkrais bodywork sessions, a particular form of re-education of movement, found significant differences between those patients and others who received faux bodywork. The most commonly used 'alternative treatments' were massage (along with physical therapy, counseling, and nutrition) for 16 respondents to a semi-structured questionnaire (Oken, 2004: 126–127). Interestingly, hypnosis has been identified as an effective adjunctive therapy for organic brain injury, Parkinson's disease, stroke, peripheral nerve lesions, cases of organic paralysis, different kinds of dystonia, and multiple sclerosis in the field of neurological disorders.

A significant relationship occurs between the brain and the immune system. In multiple sclerosis, a neuroimmunological disease, there is a possible cause for a placebo effect. Before starting an active therapy, some intervention trials had more than one evaluation, so that the placebo effect can be partly tested by contrasting the placebo treatment data with the baseline time data. Here, two examples are mentioned. In one, interferon β-la analysis, the placebo control group had a 20 percent decrease in the number of magnetic resonance imaging (MRI) lesions relative to the baseline period (Oken, 2004: 266). Rehabilitation intervention has been identified to enhance articulation accuracy, vocal sharpness, the naturalness of voice, resonance, phonation maintenance length, and living standards in dysarthria. The success of such rehabilitation services depends on the patient's contact with the specialist in speech-language and the degree of disability, behavior, and involvement.

As multiple areas of the brain regulate speech, changes in various parts of the brain can cause language deficits as a result of MS. Thus, neurodegenerative diseases and speech issues are discussed from a neurolinguistic perspective. Neurolinguistics focuses on the interaction between language and the brain and how communication is impaired by brain injury. A disease such as MS can cause irreversible nerve damage or deterioration. Therefore, the article briefly explains the characteristics, the signs, and the main indications of multiple sclerosis. Moreover, language problems that can occur in multiple sclerosis are presented such as dysarthria and aphasia which are among the conditions that occur most

commonly in MS patients. Finally, the paper outlines the treatment of speech issues. Undoubtedly, speech therapy may benefit people with multiple sclerosis who suffer from speech difficulties.

3.2.1.4 mRNA vaccine developed to treat MS-like condition

Interestingly, in 2021 researchers have discovered a possible therapy for multiple sclerosis that is based on the same technology as two of the Covid-19 vaccines[24]. Injecting messenger RNA (mRNA) into mice with an MS-like disease was done by German researchers. The mRNA had been changed to tell specific cells to make molecules that are comparable to myelin, a fatty protein that functions as a nerve cell's insulation. In MS, the immune system targets and destroys myelin by mistake. The goal of this study was to get the immune system to accept myelin instead of attacking it. When the mRNA was put into mice with MS-like illness, the researchers discovered that the animals acquired less severe disease than would be expected. The study applies technology that is comparable to that employed in two of the Covid-19 vaccines (Pfizer/BioNTech and Moderna), but in a different manner. Rather than priming the immune system to recognize and combat infection, this method instructs the immune system to accept (or ignore) myelin.

3.2.2 Aphasia

Language-related illnesses are the most difficult to identify and cure. (Erasmus, 1542 in Albinger, 2015: 30). Aphasia is a neurological disease caused by brain injury, most commonly induced by a stroke. (Brill, 2012). Aphasia is defined by fragmented, difficult speaking with relatively intact understanding. Damage to the left hemisphere is most common, especially in the Broca's region. Broca's aphasia is characterized by right-sided weakness or paralysis of the arm and leg. Wernicke's aphasia is characterized by a high level of fluency in speech but

[24] https://neurosciencenews.com/mrna-vaccine-multiple-sclerosis-17964/ Accessed 20.09.2021

significant difficulty understanding words and phrases. Although the speech is fluent, it may be lacking in important substantive words (nouns, verbs, and adjectives), as well as erroneous or even nonsensical terms (Basso, 2003). This subtype has been linked to cortical injury, particularly in the Wernicke's region. Because the brain damage is nowhere near the regions of the brain that regulate movement, the affected individuals generally have little bodily weakness.

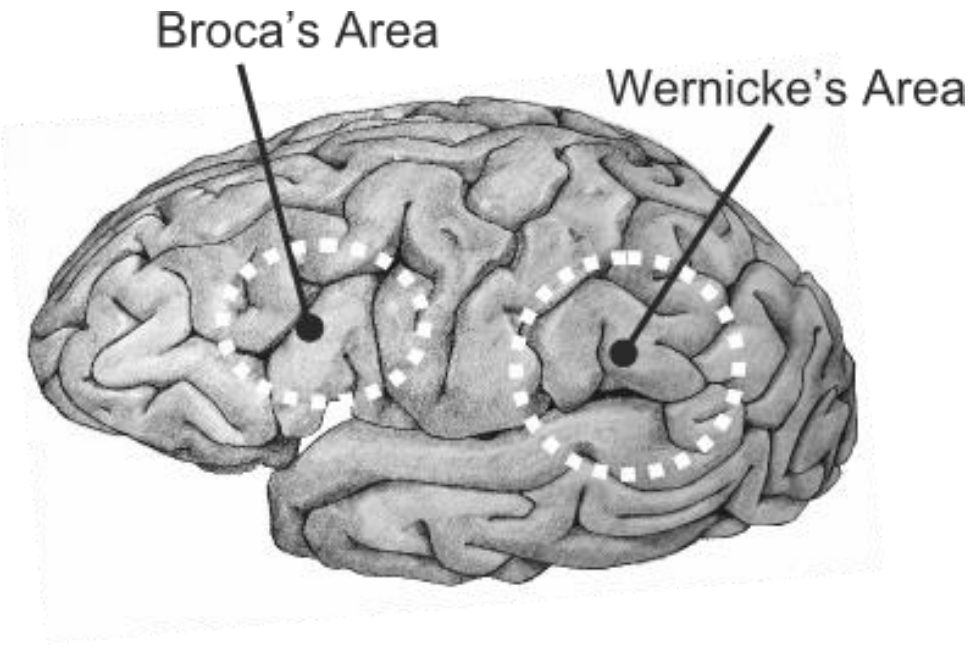


Figure 48. Distinction between Broca's and Wernicke's Area. Public domain.

Neuroscientists later developed the works of pioneers of the cognitive neurosciences such as Carl Wernicke and Paul Broca. The cortical localization of language and other cognitive functions were discovered, and theoretical models aiming to explain the meaning of these discoveries were proposed (Stemmer and Whitaker (2008: 22)). The diagnosis of language problems is the starting point for all clinical interventions. According to Stemmer and Whitaker (2008: 22):

> Among the great personalities who developed the investigation of the neuroscience of language and cognition, some authors (such as Jean Babinski, Leonardo Bianchi, Joseph Gerstmann, Russel Brain, Joachim Bodamer, and Oliver Zangwill) extended and deepened the exploration of the anatomical correlates of specific cognitive and linguistic

> disorders. In contrast, other authors (such as Henry Head, Kurt Goldstein, Eberhard Bay, Henry Hécaen, and Alexander Romanoff Luria) offered a comprehensive personal synthesis of this growing body of clinical and experimental data (Stemmer and Whitaker, 2008: 22).

The selection of the theoretical approach and choice of assessment tools are considered to be very important. Classical and contemporary assessment methods for acquired language disorders are discussed with a comparison of clinical–neuroanatomical and psycholinguistic approaches (Stemmer and Whitaker, 2008: 3). The comprehensive assessment explores in-depth the different aspects of language and, depending on the theoretical framework, provides information on the type of aphasia or the functional processing components. When it comes to specific pathologies such as dementia, traumatic brain injury, and right hemisphere brain damage, specific aspects of language may require an assessment (Stemmer and Whitaker, 2008: 3).

The doctor who diagnoses a patient's linguistic disorder must consider the different areas of language and critical related abilities and components such as cognitive functions, pragmatics, and emotions (Stemmer and Whitaker, 2008: 3). According to Stemmer and Whitaker (2008: 3), studying a language disorder is usually performed using standardized studying and standardized norm-referenced tests.

According to Stemmer and Whitaker (2008: 3):

> Higher mental functions depend on specialized cerebral substrates. A disturbance of any of these brain areas may lead to acquired disorders of language and communication. These may involve disorders of articulation, word and sentence comprehension and production, reading, and writing, which are commonly regarded as clinical manifestations of acquired language deficits. The majority of assessment tools are designed to evaluate these problems.

Aphasic syndromes are variously classified. Language disorders should be classified under ten different types. In each of these aphasia types, particular symptoms can be regarded as signs of comprehension and production problems. For example, deficits at the word, sentence, or discourse levels are common forms of comprehension disorders (Stemmer and Whitaker, 2008: 3). In contrast, reduced verbal fluency and word-finding difficulties are common forms of production disorders. Some types of aphasic disturbances, such as the loss of grammar and syntax or semantic deficits, have expressive and receptive aspects and contribute to both comprehension and production disorders (Stemmer and Whitaker, 2008: 3). Aphasias are usually grouped into two broadly defined categories: fluent and non-fluent. Fluent aphasias are distinguished by fluent speech and relatively standard articulation but difficulties in auditory comprehension and repetition. Non-fluent aphasias are characterized by relatively preserved verbal comprehension, but significant articulation and spoken production problems (Stemmer and Whitaker, 2008: 4). As has been observed by Stemmer and Whitaker (2008: 4), a comprehensive language assessment should always be based on typologies of syndromes and symptoms and a theoretical model of language functioning.

Another theoretician who contributed to the origin of neurolinguistics is Sigmund Freud. He is well known for his concept that all people are born with an id based on human pleasure and satisfaction. (Sigmund Freud ([1923] 1961: 25 cited in McLeod 2016). Whereas, the superego, as the voice of the society, performs a moralizing role by limiting people from doing things that may seem undignified or shameful. Freud (1961: 25 cited in McLeod, 2016) states that parents are crucial in a child's development as they contribute to a child's later life, such as choosing a life partner.

His first work was titled On Aphasia (1891), and it was released in 1891. In the monograph, Freud asserts that the prominent experts of the period, such as Carl Wernicke and Paul Broca, were no longer appropriate in their understanding of aphasias (Caplan, [1987] 2003: 80). Neuroscientists sought to localize psychological processes in specific brain areas at the turn of the century, a stance

Freud rejected because neuroscience had little to give dynamic psychology on the subject. In this work, Sigmund Freud expresses his first views on psychology. Freud had been fascinated with neurophysiology up to that point.(Caplan, [1987] 2003: 80). His contributions on psychoanalytic thinking are preceded by this work. Freud uncovered a significant error maintained by the traditional German school of psychology (including writers like as Meynert, Wernicke, and Lichtheim), which had taken a "localizationist" attitude, i.e., mixing psychological and physiological ideas, particularly in relation to aphasias (Caplan, [1987] 2003: 80). However, psychoanalysts such as Sigmund Freud and others who saw language learning as purely mental activity often neglected the interpersonal and social aspects of language learning and word meaning.

Nada (2006) compares data obtained from research conducted on data on agrammatic speakers and children. According to Nada (2006: 133), there are two main reasons why it is useful to compare language comprehension data from Broca's aphasic patients with those of language-learning children. The first one is related to a crucial neurological characteristic the two populations share. The capacity of their brain is reduced in comparison with that of healthy adults. In agrammatic aphasic speakers, the activation of the brain (or particular parts of the brain) is reduced due to neurological damage. In children, the brain is not entirely mature and cannot be used to its full capacity as in adults. The second important characteristic the two populations share is a consequence of the first one. As a consequence of brain damage in Broca's patients and the brain's immaturity in children, both populations' comprehension patterns deviate from the comprehension patterns of healthy adults (Nada, 2006: 133). The pattern of errors with pronouns is similar but not the same in the two populations.

In this experimental study, two sets of results from previous studies have been replicated. First, children's performance on reflexives in simple transitive sentences was significantly better than their performance on pronouns in the same constructions. Second, the interpretation of pronouns in intransitive sentences was less problematic than the interpretation of pronouns in ECM sentences. Children performed at the chance level on pronouns in ECM sentences. Unlike in many

other previous studies on pronouns in children, children performed above chance (75%) when interpreting pronouns in simple transitive constructions in the experiment. The better performance in this particular experiment can be ascribed to the difference in tasks used in the presented study, a picture selection task, and other studies that have mainly used the truth-value judgment task or a variant of this task (apart from Koster, 1993).

There are two other experimental studies where a difference in scores was found for pronouns in simple transitive sentences. Baauw & Cuetos (2003) tested Spanish children and found that children's scores were higher when using a picture selection task than the scores obtained using a truth-value judgment paradigm. Zuckerman, Baauw & Avrutin (2003) tested the same group of Dutch children with the same materials twice, once using a picture selection task and the second time using a truth-value judgment task. They found a task effect; children's scores were higher when tested with a picture selection task. In a truth-value judgment paradigm, the necessary condition is the one that elicits NO as the correct answer.

According to Zuckerman et al. (2003), after hearing the target sentence in this condition, a child must search through all possible representations for that particular sentence to find out that there is no interpretation matching the picture that accompanies the target sentence. On the other hand, a picture selection task is a less demanding task than the truth-value judgment task. Children search until they find the corresponding interpretation. They do not have to check all possible interpretations, some of which may be more difficult for them to process, such as the coreference interpretation in the case of the presented experiment. They can simply opt for the interpretation which acceptability they can check when they encounter the picture of this particular interpretation, such as the pronoun referring to an antecedent outside the sentence. Comparing the children's results with those obtained from the agrammatic patients reveals similarities in the pattern of errors on these two types of sentences (Nada, 2006: 142–143). Like children, agrammatic patients perform significantly better on reflexives than on pronouns in simple transitive sentences, and their performance on pronouns in these sentences is above chance.

The agrammatic patients performed differently from the unimpaired subjects. They scored significantly above chance in the condition that tested whether they can interpret the pronoun in the elided VP as a bound variable. This indicates that they can represent a semantic dependency, which is established immediately following the syntactic level in the economic hierarchy of referential dependencies proposed by Reuland (2001). According to the economic hierarchy, the agrammatic patients had problems processing discourse dependencies, which are more costly, even for the unimpaired speakers (Nada, 2006: 142–143). Broca's agrammatic patients can process semantic dependencies (bound variable) but fail to process discourse-related dependencies in real-time.

To conclude, agrammatic aphasic speakers can obtain the semantic (bound variable) interpretation for the possessive pronoun in VP-ellipsis constructions. However, they are incapable of establishing a discourse (coreference) dependency in the regular time course for the pronoun in the same constructions. The agrammatic patients also exhibit a preference for the bound variable interpretation. This preference reflects the processing hierarchy, which is related to the complexity of these constructions.

Different types of disorders influence viewing the world, for instance, autism. Autism is a lifelong developmental disability that affects how a person communicates with and relates to other people.

3.2.3 Autism

Autism influences how speakers make sense of the world around them. Also, visual thought, which converts words into images, is one of the features of autism (Grandin 2006: 3–4 and McDevitt, 2004: 16). While autism influences one's verbal ability, it is possible to develop visualization skills. While the disorder impairs one's communication skills, autistic children are sent to regular schools to improve their imaginative abilities, essential in learning. The variables that cause autism can be activated by direct interaction with industrial chemicals such as lead and mercury in a very early childhood (McDevitt, 2004: 20). It is worth highlighting

that it is challenging for individuals to understand autism. People sometimes assume, for example, that a child is naughty, while it is misunderstood. When it comes to defining autism, collaboration can be observed in calling persons with such traits. The word Jurodiwyj in Old Russia - described an individual as a madman or a holy fool. Such an individual acted oddly but was regarded as a model of sanctity in Russia.

Sometimes identified as alien, unknown, mysterious, unpredictable, they were often unkempt. Their presence did not matter to them. They disheveled themselves. Even in the temples, they appeared nude (a symbol of mortification, transparency-purity of the soul), with a chain around their heads , foaming at the mouth, vomiting. They were always silent, however ("infirmity" among "Slavs"), or on the contrary, they shouted (mumbled, blasphemed, insulted, asked riddles, repeated what people were saying to them - *echolalia*). These individuals were also known as indifferent to the cold or fasting. They also lived in silence. Perhaps these peculiar unusual traits seen in Christ's holy madmen or their actions show that they had autism. It is hard to say that unequivocally. Autism is often related to common issues with the functioning of society and the understanding of the environment. While the word did not appear in psychology, it was defined as one of the signs of schizophrenia. Hardly anybody has studied the disrupted mental health of children for a long time, and those who are autistic today or have autistic spectrum disorders were diagnosed as schizophrenic children.

In 1943, for the first time, Leo Kanner of Johns Hopkins Hospital identified a group of children who broke contact with the community after a short period of normal development and returned to the world of inner interactions with the corresponding need for unchanging surroundings and the restriction and selectivity of interests. In this way, Kanner defined a new illness entity from a group of historically known clinical developmental conditions such as child insanity or mental retardation, which he called "early infantile autism." (Kanner, 1943: 100-136). The word 'autism' comes from autós - alone - in Greek. This theory was proposed earlier by Eugen Bleuler in medical terms, who recognized the isolation from the outside world and obsession with the inner world due to schizophrenic

cleavage (Jaklewicz, 2012: 119-131). As per Jarema, (2011: 129) to date, one of the symptoms of schizophrenia is also referred to as autism.

3.2.4 Alzheimer's disease

Alzheimer's disease is a chronic neurodegenerative disease with various clinical characteristics and neuropathological findings (Feldman, 2007: 1). In the limbic system and related regions of the cerebral cortex, cognitive decline and psychological disorders in Alzheimer's disease (A.D.) arise from dysfunction and degeneration of synapses and consequent death of neurons (Tarazi and Schetz: 2005: 51). Alzheimer's disease is a neurodegenerative condition that is debilitating and often lethal, characterized by progressive cognitive function decline and emotional disturbances.

3.2.5 Tourette syndrome

The exact cause of Tourette's is unknown, but it is well established that both genetic and environmental factors are involved. The term Tourette syndrome was coined by Georges Gilles de la Tourette. He was a French neurologist from the nineteenth century who, while trying to classify chorea, came across the disorder. He continued to have a distinguished career, survived being shot by a patient's husband, and died from neurosyphilis (Wilkinson and Lenox, [1988] 2005: 76). In children and teens, Tourette syndrome begins with:

- Multiple motor tics, with movements, gradually evolving
- Phonic tics, usually sniffs and grunts, swearing (coprolalia) or rarely repetitive speech (echolalia);
- Obsessive-compulsive disorder, such as frequent testing or complicated rituals.

Tics react to drugs that block dopamine. With selective serotonin reuptake inhibitor or behavioral treatment, the obsessive-compulsive disorder can improve. It is possible that autoimmune responses to streptococcal infection can trigger or worsen some cases (Wilkinson and Lenox, [1988] 2005: 76). Grammar, non-linguistic elements of procedural memory, and the neuronal substrates of this mechanism are impaired by various neurodegenerative and other adult-onset disorders. Various diseases are associated with damage to various parts of the brain structures of the procedural memory system. This leads to numerous types of conditions, each of which tends to be identical across language and non-language domains (Stemmer and Whitaker, 2008: 194).

Clinical and research data point to neurochemical and functional abnormalities in the neural substrates of habit formation, in particular motor control loops, despite the lack of evidence for a discrete explanatory pathogenetic pathway or lesion for Tourette's syndrome (TS). Habits can be defined as routines that link sensory signals with motor action (Swain et al. in: Tarazi et al.,(2005: 151). The phenomenon of improvement with practice underlies the ability to learn and subsequently perform complex behaviors by coordinating such routines. Therefore, habits are an enormously adaptive component of a common evolutionary heritage (Swain et al. in Tarazi et al.,(2005: 151). There is a poor understanding of habit acquisition mechanisms, regulation, and coordination impairments, such as tics.

Table 5. Neurological disorders

Disorder	**Definition**
Autism	Autism affects how speakers make sense of the surrounding environment. Furthermore, one of the defining characteristics of autism is visual thinking, which transforms words into images (Grandin 2006: 3–4 and McDevitt, 2004: 16).
Alzheimer's disease	Alzheimer's is a progressive neurodegenerative condition with several clinical and neuropathological features (Feldman, 2007: 1). Cognitive impairment and psychological disorders of Alzheimer's disease (A.D.) in the limbic system and associated regions of the cerebral cortex emerge from synapse dysfunction and degeneration and consequent neuron death (Tarazi and Schetz: 2005: 51).
Tourette Syndrome	The disorder with onset in childhood is characterized by multiple physical (motor) tics and at least one vocal (phonic) tic. These tics may be momentarily silenced, and a premonitory impulse precedes them. There are abrupt, repetitive tics. Involuntary sounds created by moving air through the nose, mouth, or throat

	are phonic tics (Wilkinson and Lenox, [1988] 2005: 76).
Aphasia	Aphasia is a condition of speech based on logic and speaking problems. It is caused by organic brain structure injury, the partial or complete disorder of structures that program speech in a human being who has already mastered these operations (Maruszewski, 1996: 98 in Gatkowska, 2012: 35).
Multiple sclerosis	Multiple sclerosis is a chronic, inflammatory, demyelinating disease of the central nervous system. Problems with speech may appear, which is a consequence of damage to the white matter (Groetzinger,[2008] 2009: 32–34).

Autism, a chronic neurological condition that influences how an individual communicates with and interacts with others, is an example of how different forms of disabilities impact how the world is perceived. Some illnesses, such as dysarthria, Tourette syndrome, Alzheimer's disease, or other unusual neurological disorders, have an effect on communication. This section discusses communication and the major problems that arise as a result of linguistic disorders. The therapies for each of the linguistic disorders are briefly listed. The aim of this section is to present linguistic disorders and neurodegenerative diseases as potential causes of communication problems. Various types of disabilities have an effect on how people perceive the environment. Neurodegenerative diseases are a group of diseases that affect the nervous system and are either congenital or acquired. Nerve cell loss is a common pathological characteristic. Multiple sclerosis (MS), along with Alzheimer's and Parkinson's disease, is one of the most

common neurodegenerative disorders. Communication and speech disorders are one of the symptoms of Multiple Sclerosis. Dysarthria is a psychiatric concept that describes speech disorders in patients. From a linguistic standpoint, this section explores how neurolinguistics describes the neural processes in the human brain that control language comprehension, growth, and acquisition.

The field of neurolinguistics investigates the relationship between language and the brain, as well as how brain injury affects communication. Multiple sclerosis, for example, may trigger irreversible nerve damage or degradation. The definition of proper speech production is important from an anatomical and linguistic standpoint to understand the issues associated with language disorders. The development of an utterance, which includes word collection, sentence creation, and grammatical adjustment of the word forms that make up the sentence, is followed by the implementation stage, which includes spoken words and sentences. For instance:

Speech therapy may benefit people with multiple sclerosis who are having trouble communicating, such as dysarthria or aphasia. The importance of counseling cannot be overstated. Correctly, conscientiously, and systematically administered exercises enhance speech in addition to other areas. Improving one's ability to communicate brings meaning to one's life from a psychological standpoint (Gatkowska: 2012: 107). MS can result in a variety of speech disorders, ranging from mild irregularities to serious speech problems that make it difficult for anyone to understand what people are saying. It is worthwhile to seek the assistance of speech therapists in this situation.

3.3 Rare neurological disorders

The human brain is a fascinating “machine”. It is true to say that the more we know about it, the more questions there are. Furthermore, as if that was not enough, it becomes even more interesting to describe when something does not work in it. Generally, it is not easy to define a normal state and an abnormal one. What one describes as a quirk, others describe as a mental disorder. Many of them, such as depression or schizophrenia, are known almost to everyone. However, there are disorders that, although not very recognizable yet, are very interesting.

An illness is deemed uncommon if it affects fewer than 5 persons per 10,000. Rare[25]illnesses, on the other hand, are unexpectedly prevalent, putting a huge financial and health-care burden on patients. There are an estimated 5000–8000 uncommon illnesses in Europe, with 5–8% of the population suffering from one of them, many of which include neurological symptoms. Rare diseases have a genetic basis in around 80% of cases, and the majority of them start in childhood. Early detection of neurological diseases is crucial for delaying disease progression. Due to physicians' lack of knowledge about these disorders, diagnosing rare diseases can be challenging and time-consuming.

Orphan medication law provides financial incentives to businesses researching medications for rare diseases, and success in creating novel treatments for uncommon diseases requires strategic collaboration between pharmaceutical companies and researchers. Rare illness research had previously been the realm of smaller biotech firms; but, in 2010, both GlaxoSmithKline and Pfizer established rare disease departments, possibly understanding the high demand for so-called "niche-buster" medicines. While it is great that major pharmaceutical firms are interested in uncommon diseases, it is critical that they do not charge a premium for any drugs that have been proven to be effective.

There are several cases presenting how brain damage can affect human brain and communication and at the same time the improvement of some abilities

[25] Rare diseases: https://www.thelancet.com/journals/laneur/article/PIIS1474-4422(11)70001-1/fulltext, 2011. Accessed: 22.04.2021.

such as music. When a neuron is triggered, it sends an electrical signal down its axon, which causes a chemical to be released from its end, known as a neural transmitter. This spreads through the synaptic cleft, which divides the axon from the dendrite of a neighboring neuron. As the neural transmitter meets certain chemical receptors, the dendrite becomes activated, and an electrical signal spreads along its own neuron (Mithen, 2011: 26). Humans can only talk and sing because of the way neurons are related to one another and the brain activity they promote – but it's still unclear how the firing of neurons and the release of chemicals inside the brain become a thought or a feeling. Neural networks are collections of associated neurons that relate to particular activities (Mithen, 2011: 26).

The neural networks are found in the cerebral cortex, the most recently developed region of the brain that has grown exponentially in size over the course of human evolution. 2 The brain is made up of a number of distinct anatomical elements that are all present in other mammals, though their relative size and importance differ significantly. The cerebrum, which is divided into left and right cerebral hemispheres with strongly convoluted or folded surfaces, is in control. Each of the folds' 'hills' is known as a gyrus (plural gyri), and each of the 'valleys' is known as a sulcus (plural sulci) (Mithen, 2011: 27).

The use of brain imaging is a common method of researching the brain. Different approaches for investigating both brain anatomy and the patterns of brain activity that occur when certain activities are done have been accessible since the 1970s. Among the methods utilized are computerized tomography (CT), positron emission tomography (PET), functional magnetic resonance imaging (fMRI), electroencephalography (EEG), and magnetoencephalography (MEG). Despite the fact that these approaches are at the leading edge of scientific research, the principles that support them are straightforward. CT scans are similar to X-rays in that they provide images of the inside of the body. (Mithen, 2011: 28).The second form of brain science, lesion analysis, has recognized for more than a century that various functions are to some degree clustered in different parts of the brain. A lesion is a tissue disruption caused by an injury, stroke, or disease. If the lesion is not fatal, it is possible to monitor what forms of sensory, cognitive, or motor

functions have been lost and then develop theories about the function of the brain area that has become inactive as a result of the lesion. Prior to the invention of brain imaging, scientists had to wait until the patient died before performing an autopsy to discover the lesion (Mithen, 2011: 28). Today, brain-imaging techniques can pinpoint the location of the lesion, while a battery of well-designed experimental experiments can pinpoint the precise deficit that has developed. The best insights into the neural bases for music and language have come from this combination of lesion analysis and brain imaging (Mithen, 2011: 28).

Medical case studies of people with aphasia provide us with the ideal opportunity to investigate the neural connections between music and expression. If, for example, music is a derivative of language or vice versa, then the loss of musical capacity should be an automatic result of language loss. If, on the other hand, music and language depend on completely separate neural networks, the loss of one should have little effect on the other (Mithen, 2011: 29). As an example, a musician and composer: Vissarion Yakovlevich Shebalin has suffered a moderate stroke in his left temporal lobe at the age of fifty-one, which affected his right hand, right side of his face, and speech. Shebalin was unable to construct sentences or to name objects (Mithen, 2011: 30). Despite his ailments, Shebalin continued to write and teach his students by listening to, analyzing, and correcting their compositions. He finished musical pieces that he had started before his illness and produced a number of new works that have been compared to everything he had done previously (Mithen, 2011: 30).

Another case to present is the case of NS (usual practice for medical patients to be referred to by their initials. During heart surgery, he had a stroke while under anaesthetic. He couldn't understand what people were saying when he awoke, explaining that they appeared to be speaking too quickly (Mithen, 2011: 30). His own speech was unaffected, and he was still able to read and write. An MRI revealed a lesion along the superior temporal gyrus in the right temporoparietal area. NS's quality of life had deteriorated significantly. However, he received some compensation in the form of increased musical appreciation (Mithen, 2011: 31). He could tell the difference between different rhythms and whether or not the

examples he heard were the same or different. He might hum the rhythms and tap them out on a table as well (Mithen, 2011: 31). While a right temporal lesion has been known to affect the ability to comprehend environmental sounds, NS's case was the first to show that it often resulted in speech aphasia Mithen, 2011: 31). He would have relied on a neural pathway for language in the right cerebral hemisphere rather than the left, unlike the vast majority of people.

3.3.1 The case of Patient *Tan*

The case of Patient *Tan* was described by the outstanding French brain researcher, Paul Broca. The term *Tan* was used because the word tan was the only word the patient could say, although he could write everything and understood everything correctly; however, when he had to say something, the only word he could pronounce was *tan* (Andrewes, 2013: 292). When Broca, after the patient's death, examined his brain and brains of people with similar cases, it turned out that all the damage was in a similar place, today called the Broca's area. Thanks to that, it is now known that particular parts of the brain have their precisely defined roles. On the other hand, cases of foreign accents are rarer cases that, paradoxically, do not have to be associated with speech centers (Andrewes, 2013: 292). It turns out that this disease is accompanied by entirely different organs, tongue, and mouth. This may be a consequence of disorders of the movement centers that control the face and throat (Andrewes, 2013: 292). Not often, but it turns out that people do not need to be injured to acquire this syndrome. However, the vast majority of cases with injuries and strokes are related to the occurrence of aphasia.

3.3.2 The H.M Patient

Henry Molaison was the patient whose brain was tested most often throughout history and thanks to whom scientists know more about memory. Henry Molaison had suffered from severe epileptic seizures resulting from cranial damage due to a cycling accident when he was seven years old. After not responding to any medication, in desperation Henry's mother turned to doctor William Beecher Scoville, a neurosurgeon known worldwide for his risky operations. He suggested that Henry's condition is a consequence of the improper functioning of temporal lobes and recommended their removal. In 1953 this groundbreaking operation took place. However, it was failure and left Henry being unable to create long-term memories.

When brain injuries heal they become epileptogenic and generate epileptic seizures (Dittrich, 2016: 8). In the case of Henry, the seizures were minor at first—little instants of some dazed moments, short absences. Nonetheless, his transformation into patient H.M., the most studied individual in the history of neuroscience, had begun. For almost six decades, the scientists who studied Henry kept his name hidden. When they wrote about him, they were always careful not to reveal too much, fearing that outsiders might successful find him. There was not a single paper, out of the hundreds that chronicled in great detail the experiments performed on Henry during the fifty-five years between his operation and that contained anything but the vaguest biographical information about Henry himself (Dittrich, 2016: 8).

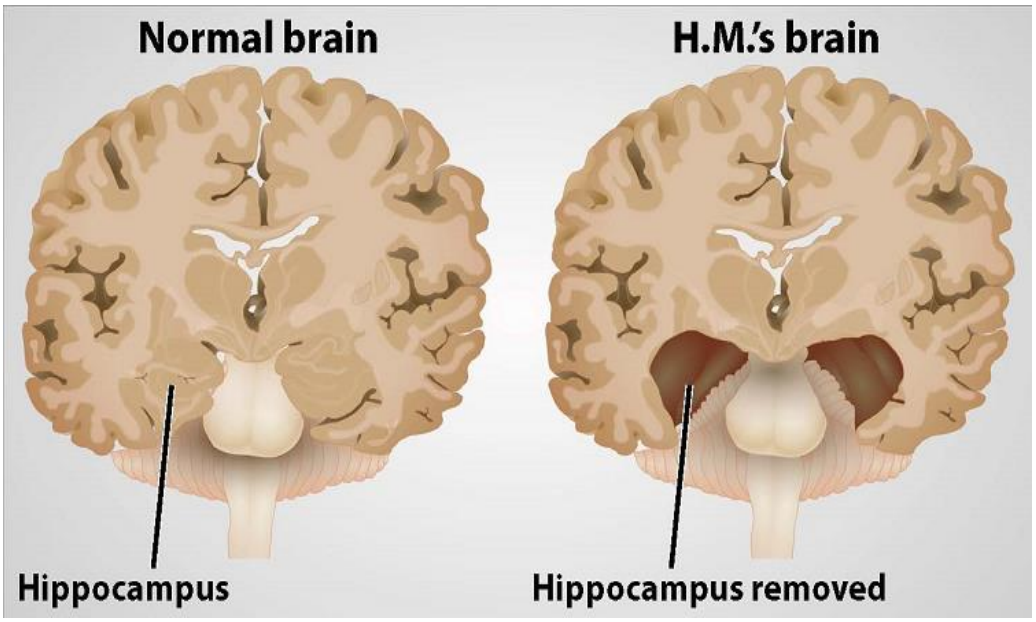


Figure 49. Image presenting Molaison's brain after surgery[26]

"Right now, I'm wondering," he said. "Have I done or said something amiss? You see, at this moment, everything looks clear to me, but what happened just before? That's what worries me. It's like waking from a dream" (Dittrich, 2016: 14).The patient also described his inner state in this way: a persistent feeling that he had just come out of a dream. To explain the sensation, there is a psychological term used: hypnopompic condition. Interestingly, today, people who study skulls from various cultures, different civilizations, different centuries all over the world, have found something widespread: skulls have human-made holes in them, which indicates that ten thousand years ago, people started to cut holes in their skulls (Dittrich, 2016: 14). Medical historians noticed holes in ancient Inca skulls in Peru, with those holes almost always located on the upper left-hand side at the so-called left frontoparietal area . Perhaps these surgical holes were part of their care for head injuries of the Inca skulls sustained during fights.

The scraped skulls fascinated Paul Broca, a pioneering French nineteenth-century neuroanatomist (Dittrich, 2016: 15). He noticed that they predated anesthesia, which was developed around 400 B.C. in its crudest form. As Assyrian

[26] Image presenting Molaison's brain. http://www.brainfacts.org/in-the-lab/tools-and-techniques/2018/the-curious-case-of-patient-hm-082818. Accessed: 25.04.2020.

surgeons triggered unconsciousness by compressing their patients' carotid arteries as early as 3500 B.C., researchers speculated that the operations might have been done when they were small children because an infant's thinner skull would not take so long to get through. Broca collected multiple corpses of all ages to prove his point and showed that although it took him almost an hour to run through an adult's skull, he could do the same in less than five minutes with a two-year-old boy.

3.3.3 Foreign language syndrome

Foreign accent syndrome is a psychiatric disorder in which patients acquire speech patterns that are considered a foreign accent distinct from their native accent without learning it in the place of origin of the perceived accent (Kurkowski et al. 1996: 1). The term Foreign Accent Syndrome was first coined in 1982 by Harry Whitaker (Mariën and Keulen, 2019: 94–113). To diagnose someone with F.A.S., he initially suggested several criteria that must be present; they must be monolingual, they must have damage to their central nervous system that affects their voice, and their speech must be viewed by themselves or clinicians as subjectively sounding foreign (Mariën and Keulen, 2019: 94–113)[27]. Most F.A.S. patients develop F.A.S. due to stroke, but other cases are due to either injuries or tumors or due to developmental or psychiatric disorders (Mariën and Keulen, 2019: 94–113). The majority of the patients with a neurological injury have a lesion in the left supratentorial hemisphere. The premotor cortex, motor cortex, basal ganglia, or Broca's region are mainly affected by lesions. In the cerebellum, which projects to the former regions, lesions are also seen. Harm to the right hemisphere infrequently induces F.A.S. Many F.A.S. patients often have other speech disorders, such as autism, aphasia, dysarthria, agrammatism, and speech apraxia (Mariën and Keulen, 2019: 94–113). Intense speech therapy is the required treatment. All approaches that have been used in the past are methods such as oral

[27] Mariën, Peter; Keulen, Stefanie; Verhoeven, Jo (J2019). "Neurological Aspects of Foreign Accent Syndrome in Stroke Patients". *Journal of Communication Disorders*. 77: 94–113.

motor exercises, mirror usage, targeting phonetic knowledge, reading lists and messages, and using electropalatography. As per Mariën and Keulen (2019: 94–113) after a proper therapy, about a fifth of F.A.S. patients goes into remission.

However, there are no scientifically confirmed cases of learning a new language through brain damage. If there is a change in using the speech, the language must have already been known, as in the case of a speedway driver who, after an accident, fell into a coma, and when he woke up, he allegedly spoke English well. Even if this is true, it should be remembered that he also knew this language to some extent before the accident.

Rare neurological disorders affecting speech and communication:

Table 6. Rare neurological disorders.

Disorder	**Definition**
The case of Patient *Tan*	Due to a near-total loss of speech, a Frenchman, known by the nickname "Tan", was hospitalized. A physician, Paul Broca (1824–1880), who used this opportunity to announce that he had found the cortical speech center in the middle part of the patient's left frontal lobe, researched his case. Later on, this area was called "Broca's area" (Andrewes, 2013: 292).
The Patient H.M.	An American patient who lost the ability to create new memories during an experimental brain operation to remove his epilepsy. He recalled the events before the surgery, but his brain was unable to store new memories. His functioning and short-term memory

	were intact. The studies he took part in revolutionized the understanding of brain functioning mechanisms (Dittrich, 2016).
Foreign language syndrome.	Foreign accent syndrome is a psychiatric disorder in which patients acquire speech patterns considered a foreign accent. Most F.A.S. patients develop F.A.S. due to a stroke, but others due to injuries or tumors, developmental or psychiatric disorders. Therapy should be generated on a case-by-case basis. After the treatment, about a fifth of F.A.S. patients go into remission (Mariën and Keulen 2019: 94–113)

This section presents the communication and the main issues resulting from linguistic disorders. Various categories of disorders affect viewing the world and communication. Autism, Alzheimer's disease, or Tourette syndrome are lifelong developmental disabilities that affect how a person interacts with others. The mechanism leading to the appearance of neurodegenerative disease symptoms starts much earlier and are asymptomatic for a long time. When many neurons are injured, or the damage affects a part of the central nervous system, the first signs occur.

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3.4 Chapter conclusions

Neurodegenerative disorders are a group of congenital or acquired progressive nervous system diseases in which the prominent pathological characteristic is the nerve cell failure. Multiple sclerosis and Alzheimer's disease are among the most common neurodegenerative diseases. Neurolinguistics studies the interaction between language and the brain and how communication is impaired by brain injury. A disease such as aphasia may cause the nerves to undergo permanent damage or deterioration. The definition of proper speech production is essential from an anatomical and linguistic perspective to understand the issues associated with language disorders.

Direct communication occurs when verbal communication carries the real intentions; indirect communication, on the other hand, occurs when the real intentions are uncertain in the whole communication process. However, communication may be unclear because of language disabilities described in this chapter. Language disorders frequently stem from neurodegenerative diseases. Some treatments and therapies can help patients communicate better with people around them. It is worth stressing that society may reject people with linguistic disorders as they are often misunderstood, for instance, patients with Tourette syndrome or autism. Therefore the importance of social awareness of the diseases that affect language abilities should be stressed to avoid judgment and alienation of those who are disabled.

Autism, a chronic neurological condition that influences how an individual communicates with and interacts with others, is an example of how different forms of disabilities impact how the world is perceived. Some illnesses, such as dysarthria, Tourette syndrome, Alzheimer's disease, or other unusual neurological disorders, have an effect on communication. This section discusses communication and the major problems that arise as a result of linguistic disorders. The therapies for each of the linguistic disorders are briefly listed. The aim of this section is to present linguistic disorders and neurodegenerative diseases as

potential causes of communication problems. Various types of disabilities have an effect on how people perceive the environment.

Neurodegenerative diseases are a group of diseases that affect the nervous system and are either congenital or acquired. Nerve cell loss is a common pathological characteristic. Multiple sclerosis (MS), along with Alzheimer's and Parkinson's disease, is one of the most common neurodegenerative disorders. Communication and speech disorders are one of the symptoms of Multiple Sclerosis. Dysarthria is a psychiatric concept that describes speech disorders in patients. From a linguistic standpoint, this section explores how neurolinguistics describes the neural processes in the human brain that control language comprehension, growth, and acquisition. The field of neurolinguistics investigates the relationship between language and the brain, as well as how brain injury affects communication. Multiple sclerosis, for example, may trigger irreversible nerve damage or degradation. The definition of proper speech production is important from an anatomical and linguistic standpoint to understand the issues associated with language disorders. The development of an utterance, which includes word collection, sentence creation, and grammatical adjustment of the word forms that make up the sentence, is followed by the implementation stage, which includes spoken words and sentences. For instance:

Speech therapy may benefit people with multiple sclerosis who are having trouble communicating, such as dysarthria or aphasia. The importance of counseling cannot be overstated. Correctly, conscientiously, and systematically administered exercises enhance speech in addition to other areas. Improving one's ability to communicate brings meaning to one's life from a psychological standpoint (Gatkowska: 2012: 107). MS can result in a variety of speech disorders, ranging from mild irregularities to serious speech problems that make it difficult for anyone to understand what people are saying. It is worthwhile to seek the assistance of speech therapists in this situation.

If fewer than 5 people per 10,000 are affected by an illness, it is termed uncommon. Rare illnesses, on the other hand, are unexpectedly prevalent, putting sufferers under a significant financial and health-care burden. In Europe, there are

an estimated 5000–8000 uncommon diseases, with 5–8% of the population suffering from one of them, many of which present themselves neurologically. In roughly 80% of cases, rare diseases have a genetic foundation, and the majority of them begin in childhood. Early detection of neurological conditions is crucial for slowing disease progression. Owing to physicians' lack of knowledge about these disorders, diagnosing rare diseases can be complex and time-consuming.

General conclusions

The history of linguistics with a particular focus on one of the subdisciplines of linguistics, early Wrocław neurolinguistics, is the research perspective adopted in the dissertation. The discovery of the origins and dynamics of neurolinguistics' development is closely linked to a pioneer in this study field, Carl Wernicke. It should be remembered that the studies were carried out at the *Universität* Breslau by other German scientists as well before the Second World War. There is much evidence that a large part of the research was performed in Breslau. Archival documents located in Wrocław, Berlin, and Frankfurt am Main support this thesis. Breslau was highly linked with other university institutions, mainly with Charité – Berlin, The Frankfurt University, and the *Senckenberg Institute*. These materials indicate that Wrocław was indeed the scientific center of Europe and that the findings made at centers in Wrocław impacted the growth of the neuroscience studies. The pioneers' discoveries on brain functions and their connection to language disorders impacted the research on other disorders that disrupt communication. Autism, multiple sclerosis, Alzheimer’s disease, or Tourette syndrome are life-long developmental disorders affecting how a person communicates with others.

The required components of the study, such as linguistics, psychology, neurology, and psycholinguistics, are covered to better understand the meaning and relevance of neurolinguistics. These disciplines have been influenced significantly by the development of what is now known as neurolinguistics. The studies' founders are presented, and the related findings they obtained are discussed. Without studying linguistics, people will struggle to understand how languages function and how particular words form beliefs. However, in some circumstances, a person's mind is unable to function properly, necessitating the application of psychology; thus, for that reason, the value of psychology is addressed. Psychology helps us understand how the human mind works, and how words are used. A healthy, well-developed brain is essential for a properly functioning mind. Neurology studies a variety of neurological disorders that

influence human speech and language. Psycholinguistics, on the other hand, examines the connections between psychological mechanisms and linguistic action, such as language learning..

While it is possible to distinguish language and culture, the consequences of doing so must be considered. It is worth noting that language use is determined by both language systems and cultural values; therefore, there is no claim that there is no connection between language and culture. Language is, by definition, a human-only trait. People have developed creativity, which is a part of human nature, as a result of their thoughts and understanding. The hereditary determination of a subset of physical properties accounts for the complexity of humans. A language can be both creative and destructive; however, the message is the most important aspect. A language can be helpful in social situations, but it can also be harmful and ambiguous. People must be able to use speech effectively in order to send messages consciously. Both the sender and the receiver, who remain together in a communicational situation, are required to perform the communicative role. However, today's most pressing issue about scientific advances is that almost all we know about the human mind and brain is focused on research conducted by mostly English-speaking university students. It means that all knowledge about the human mind is extremely limited and biased; therefore people speaking different languages can contribute more linguistic feedback. A person's mind is defined by the language they speak, particularly from a psychological standpoint.

Psychologists are interested in learning more about the human brain. Theoretical positions have pushed the field of mental illness research forward. The Freudian psychoanalysis model, which is a systematic psychodynamic method, dominated study in this field in North America during the first half of the twentieth century. All fields of medicine are intertwined; for example, brain damage can result in imperfect speech, described more precisely in the thesis. The distinctions between various subspecialties are often ambiguous. Given these claims, neurology is more likely than any other discipline to be more closely related to internal medicine.. Furthermore, neurology is a large, complex, and rapidly

expanding field. The position of a neurologist should be discussed. A neurologist is a doctor who specializes in neurological disorders and is qualified to study, diagnose, and treat them. Clinical studies can also include neurologists. Although neurology is a non-surgical discipline, neurosurgery is its surgical counterpart. While war is a negative word, discoveries made in ancient times and during World War II had a major impact on modern medicine, especially in the area of the brain. The study of the psychological aspects of language, on the other hand, is strongly linked to charismatic leaders, particularly during times of war. Politicians are increasingly relying on psychological and linguistic factors during elections. Psycholinguistics is the study of the psychological factors that enable people to use and understand language. The concept psycholinguistics appears to have originated in the field of language psychology. However, a Cornell University seminar in 1951 is often credited with establishing psycholinguistics as a discipline. The fact that this seminar was published in both a psychological and a linguistic journal reflects the field's interdisciplinary nature.

Psycholinguists became interested in the mechanisms that occur in the brain as people use language, which led to the development of neurolinguistics. Glottodidactics and methodology of foreign language acquisition use studies on language learning processes. Psycholinguistics is a branch of psychology and linguistics that studies the psychological underpinnings of language function, or how language is learned, interpreted, and used by the human mind.. Jean Piaget [1896–1980], Burrhus Frederic Skinner [1904–1990] (whose behavioral theory revolutionized the perceptions of language learning and the phases of speech acquisition), and Noam Chomsky are three of the most important psycholinguists. As part of his argument, Chomsky brought the idea of mental representations to the study of language. He also created a major contrast between people's language understanding, which he referred to as "competence," and their language usage, which he referred to as "efficiency," akin to Ferdinand de Saussure's distinction between langue and parole, which he made about 60 years prior. Chomsky's emphasis on competence (rather than performance) has led linguistics in this direction, and his emphasis on competence (rather than performance) has had a

considerable influence on modern linguistics and psycholinguistics. Psychology, on the other hand, remained fascinated by the idea of language output. Nonetheless, in the 1960s, psychologists experimented with Chomsky's proposals about the essence of syntactic structure and his work on transformation grammar to see if the suggested linguistic processes were indeed psychological processes. Neurolinguistics includes almost the same range of topics as psycholinguistics does, i.e., all aspects of language processing; however, it is considered from different scientific perspectives and methodologies. While psycholinguistics is the study of the interrelation between linguistic and psychological aspects, neurolinguistics studies the neural mechanisms in the human brain that control the comprehension, production, and acquisition of language. The roots of neurolinguistics can be traced back to Carl Wernicke and Paul Broca's studies on aphasia. Nonetheless, Wernicke's students and successors at the *Universität* Breslau continued and creatively developed their master's projects in this field before the Second World War.

Wrocław is one of Europe's fastest growing cities. The political and cultural relations of the Silesian capital have shifted many times. Central Europe, which is a rich mix of nationalities and traditions, was influenced by a multitude of encounters, including the influence of both Nazis and Stalinists. The city was labeled the microcosm of Central Europe because of the ongoing competition between two opposing visions: "the German city of Breslau" and "Polish Wrocław.". The word microcosm is true because historical events shaped how it is now perceived: as a multicultural and multilingual city with a lot to give. Breslau in 1870, when Carl Wernicke received his medical degree, was a hive of cultural activity, with festivals and circuses held often in the town center. That can now be evoked thanks to the *Breslauer Zeitung* (1870), which accurately represented all events that occurred on a given dayIt's worth recalling the that paper had several editions every day, indicating that people were involved in a wide range of social issues, science, and, most notably, politics.

Carl Wernicke, a pioneer in this field, is closely associated with the investigation of the origins and dynamics of neurolinguistics development. It's

worth noting that the University of Breslau was the birthplace of neurolinguistics and the site of study by other German scientists prior to Second World War Professor Carl Wernicke, as previously mentioned, was the central figure in these studies, and his students continued and creatively developed their master's projects in this field. The majority of the study was carried out at the *Universität* Breslau, which is now located in Wrocław. Carl Wernicke, the Breslau academy, and the history of aphasia can all be found in periodicals, journals, and books that can be found in libraries all over the world. Wrocław (Breslau), Berlin, and Frankfurt am Main all have a large number of original texts. The library at the University of Wrocław now has a collection of source texts. The medical faculty of the University of Wrocław is connected to the origins of psychiatry. Henrich Neumann began giving psychiatric lectures in 1836. The popular "Breslauer Psychiatrische Schule" was established by Carl Wernicke, Neumann's successor. Its members are inextricably linked to the history of medicine; as a result, Wrocław is now recognized as one of Europe's most important centers for neurological science. Nonetheless, Breslau and its members were closely linked to other cities and institutions, such as Berlin's Charité Institute and Frankfurt University, where important breakthroughs in language and the brain took place.

Furthermore, as a result of these findings, we now have a better understanding of neurodegenerative diseases. Neurodegenerative disorders are a category of congenital or acquired progressive nervous system diseases characterized by nerve cell loss as the most prominent pathological feature. The most common neurodegenerative disorders are multiple sclerosis and Alzheimer's disease. Neurolinguistics investigates the relationship between language and the brain, as well as how brain damage affects communication. The nerves may be permanently damaged or deteriorated as a result of a condition like aphasia. Because of language impairments, communication can be difficult as a result of neurodegenerative diseases. Neurodegenerative conditions are often the cause of language disorders. Some medications and therapies can assist patients in communicating more effectively with others. It is important to note that individuals with linguistic disabilities, such as patients with Tourette syndrome or autism, may

be rejected by society because they are often misunderstood. As a result, the importance of social knowledge of diseases that affect language abilities should be emphasized in order to prevent discrimination and alienation of disabled people.

Summary

Przedmiotem badania pracy jest przedstawienie rozwoju prac nad językiem które współcześnie są określane jako neurolingwistyka. Warto nadmienić, iż początków neurolingwistyki należy upatrywać w badaniach prowadzonych przez niemieckich naukowców przed drugą wojną światową w Breslau *Universität*. Prym w tych badaniach wiódł z wykształcenia psychiatra, prof. Carl Wernicke, którego liczni uczniowie kontynuowali i twórczo rozwijali w tym względzie projekty swojego mistrza. Perspektywą badawczą, jaką przyjęłam w swojej pracy jest historia językoznawstwa, natomiast za materiał badawczy posłużyły mi teksty archiwalne, które zostały zgromadzone w bibliotekach we Wrocławiu: Biblioteka Universytecka we Wrocławiu oraz w Niemczech: Charité Medical Library w Berlinie i University Library Johann Christian Senckenberg we Frankfurcie nad Menem.

Język jest nierozłącznym elementem kultury i odgrywa ważną rolę w percepcji środowiska przez system kognitywny każdego z ludzi. Nadal jednak nie wiadomo, czy język ewoluował w celach społecznych do łączenia grup społecznych, czy też po to, aby przekazywać instrukcje. Język może też być wrodzony – wskazuje na to fakt, iż dzieci rodzą się z podstawową wiedzą na temat rodzajów zdań i zdolnością do rozumienia niejednoznacznych wyrażeń. Żadna z powyższych teorii nie sprawdzi się jednak, jeśli nie ma odpowiedniego środowiska dla dziecka, aby rozwinęło tę umiejętność. Przypadki dzikich dzieci dowodzą, że umysł ludzki może rzeczywiście być jak tabula rasa i że rodzice odgrywają kluczową rolę w procesie rozwoju języka. W analizowaniu zaburzeń językowych istotne jest badanie, w jaki sposób ludzie przyswajają język. To prawda, że pod wieloma względami wszystkie języki są do siebie podobne. Dowodzi tego teoria uniwersalnej gramatyki (Chomsky 1986 cytowany w Crain 1999: 16–17). Jednak zgodnie z teorią w każdym języku istnieje inny zestaw parametrów tworzący gramatykę, dlatego języki są pod pewnym względem inne. Uważa się, że każdy ludzki umysł jest bardzo złożony, a dzięki wrodzonej wiedzy ludzie mogą przyswajać języki.

O’Grady (2001: 439) przedstawia podstawowy argument Chomsky’ego dotyczący uniwersalnej gramatyki i wrodzoności, która mówi, że dzieci rodzą się z całą wiedzą na temat kategorii, które znajdują się w gramatyce każdego języka. Ten zestaw wrodzonych kategorii jest wspólny dla wszystkich języków, które tworzą uniwersalną gramatykę. W opinii Chomsky’ego (1986 cytowany w Crain 1999: 16–17) gramatyka musi być wrodzona, ponieważ jest zbyt złożona i zbyt abstrakcyjna, aby można było się jej nauczyć. Crain (1999: 16–17) dostarcza dalszych dowodów na hipotezę Chomsky’ego, stwierdzając, że nie jest możliwe, aby dziecko było nastawione na wszelkie możliwe niejednoznaczne i abstrakcyjne wyrażenia w dzieciństwie. Gramatyki są zbyt złożone i zbyt abstrakcyjne, aby można było się ich nauczyć w krótkim czasie, niemniej jednak ludzie są w stanie zrozumieć kontekstową niejednoznaczność zdań, zatem musi to być wrodzona wiedza kategorii fraz, która pomaga im to zrozumieć. Wydaje się, że wrodzona wiedza o frazach i kategoriach istnieje oraz że fraza jest zjawiskiem uniwersalnym.

W opinii Yanga (2006: 27–39) języki są podobne, ale różnią się pod względem parametrów, które tworzą gramatykę. Ciekawym faktem związanym z funkcjonowaniem ludzkiego mózgu jest to, że nauka języka następuje w taki sam sposób jak pozyskiwanie biologicznie kontrolowanych zachowań. Ustalenia Erica Lenneberga (Lenneberg 1967 cytowany w Bergman 2007: 311–313) dotyczące zachowań zwierząt wykazują podobieństwo między nabywaniem biologicznie kontrolowanych zachowań a przyswajaniem języka przez dzieci. Biologicznie kontrolowane zachowania to te, które wymagają odpowiedniego środowiska do właściwego rozwijania umiejętności – cennym środowiskiem dla dzieci są ich rodzice. Co ciekawe, dziecko nie musi być specjalnie uczone języka, aby mówić; wystarczy, aby było nastawione na język rodziców, co skutkuje nabywaniem słów i struktur gramatycznych.

Ponadto nauka języka nie jest wynikiem świadomego wyboru, ponieważ dzieci uczą się języka instynktownie. Niemniej jednak istnieje możliwość, że dziecko nie nauczy się języka, ponieważ wrodzone zachowania uaktywniają się mniej więcej do 12. roku życia. Oznacza to, że jeśli do tego momentu dziecko nie zostanie nastawione na język, wówczas nigdy nie zdobędzie umiejętności

językowych i nie będzie w stanie komunikować się z resztą społeczeństwa (Bergman 2007: 313). Wszystkie języki wykazują podstawowe podobieństwa, a zatem pewna wiedza językowa może być wrodzona. Niemniej jednak bez pewnych czynników nigdy nie można rozwijać biologicznie kontrolowanego zachowania. Przypadki dzikich dzieci na całym świecie, wychowanych przez zwierzęta poza kulturą i cywilizacją pokazują, że takie dzieci zachowują się podobnie do zwierząt, z którymi dorastały (Candland 1993: 15). Niestety dzikie dzieci nie są w stanie nabyć języka ani opanować ludzkiego zachowania w późniejszym życiu.

Perspektywą badawczą, którą przyjmuję w rozprawie, jest historia lingwistyki (ze szczególnym uwzględnieniem jednej z subdyscyplin językoznawstwa, jaką jest wczesna wrocławska neurolingwistyka). Neurolingwistyka (lub neurojęzykoznawstwo – oba terminy stosuję tutaj zamiennie, dokładne wyjaśnienie i opis obu terminów znajduje się w mojej rozprawie) pierwotnie wchodziło w zakres psychologii oraz neurologii. Profesor Carl Wernicke, niemiecki lekarz, anatomista, psychiatra i neuropatolog, jest znany przede wszystkim ze swoich wpływowych badań nad afazją. Jego badania, podobnie jak te, które prowadził prof. Paul Broca, doprowadziły do przełomowych odkryć w lokalizacji funkcji mózgu, w szczególności mowy. Po latach prace pionierów neurologii kognitywnej (Carl Wernicke i Paul Broca) zostały opracowane przez innych neurojęzykoznawców. Wykryto lokalizację języka i innych funkcji poznawczych, zaproponowano modele teoretyczne mające na celu wyjaśnienie znaczenia tych odkryć (Stemmer i Whitaker 2008: 22).

Materiał badawczy składa się z archiwalnych zapisów dokumentujących badania prof. Carla Wernickego i badaczy z Breslau, obecnie Wrocławia, który jest jednym z najszybciej rozwijających się miast w Europie. Stolica Dolnego Śląska wielokrotnie zmieniała powiązania polityczne i kulturowe. Wiele doświadczeń kształtowało Europę Środkową, w tym bogatą mieszankę narodowości i kultur. Ponieważ wciąż istnieją dwie konkurencyjne wizje – „niemieckiego miasta Breslau" i „polskiego Wrocławia" – miasto to bywa nazywane jako mikrokosmos Europy Środkowej (Davies i Moorhouse 2002).

Określenie „mikrokosmos” dobrze oddaje rzeczywistość, ponieważ historyczne wydarzenia przyczyniły się do tego, jak Wrocław jest obecnie postrzegany – jako miasto wielokulturowe i wielojęzyczne, które ma wiele do zaoferowania. Warto zauważyć, okres badań naukowych Wernicka był zarazem początkiem antysemityzmu w Breslau. Publikacja Word and Actions: Rethinking the Social History of German Antisemitism (Breslau, 1870–1914) opisuje czas, kiedy Carl Wernicke żył we Wrocławiu. Jednak badacz jest słabo rozpoznawalny w Polsce przez osoby niezaznajomione z nauką. Uczony ten był pionierem neurolingwistyki, lekarzem, anatomem, psychiatrą i neuropatologiem we Wrocławiu. Mimo że na całym świecie postrzegany jest jako pionier neurojęzykoznawstwa, nieliczni znają szczegóły z jego życia. Istnieje wiele prac i artykułów, które przetrwały w bibliotekach we Wrocławiu i na całym świecie i przyczyniają się do rozwoju neurologii. Carl Wernicke został lekarzem medycyny w 1870 r., a jego praca doktorska *Erkrankung der inneren Kapsel. Ein Beitrag zur Diagnose der Heerderkrankungen*, poświęcona chorobom dziedzicznym, została wydana w 1875 r. w Breslau.

Co więcej, materiały pochodzące z Charité Institute w Berlinie oraz z głównej biblioteki we Frankurcie nad Menem są przedstawione oraz opracowane. Materiały te dowodzą temu iż Wrocław rzeczywiście był naukowym centrum Europy i odkrycia dokonane we Wrocławskich ośrodkach rzutowały na rozwój neurojezykoznawstwa. Głównym celem tezy jest odbudowanie grupy badaczy – uczniów Carla Wernickego, którzy przyczynili się do rozwoju neurolingwistyki we Wrocławiu. Uczeni byli przeważnie neurologami i psychiatrami, zajmowali się dziedziną nauki, która jeszcze nie została nazwana neurolingwistyką. Sylwetki uczenych zostaną przeanalizowane jako członków grupy badaczy, którzy przyczynili się do przełomowych osiągnięć w psychologii i neurologii we Wrocławiu.

W pierwszym rozdziale przeanalizowana została historia badań nad analizą mózgu i języka, w tym historię psychologii oraz neurologii – dziedzin, z których wywodzi się neurojęzykoznawstwo

Tematyka drugiego rozdziału rozprawy bazuje na materiałach archiwalnych z Wrocławia, Berlina oraz Frankfurtu nad Menem. W trzecim rozdziale opisane zostały choroby języka, w tym zwłaszcza przedmiot badań Wernickego: afazja, a w celu porównawczym – także autyzm, zespól Tourette'a, choroba Alzheimera i stwardnienie rozsiane.

Osiągnięcia pracy są następujące:

- Pełne przedstawienie oraz zrekonstruowanie grupy badaczy z Breslau *Universität* oraz z innych niemieckich instytucji badawczych.
- Przedstawienie rozwoju prac naukowych które przyczyniły się do rozwoju badań nad mózgiem i językiem, obecnie określanymi neurojęzykoznawstwem.
- Zlokalizowanie materiałów archiwalnych dzięki którym można stwierdzić iż początki badań nad mózgiem i językiem miały miejsce w przedwojennym Wrocławiu.
- Przedstawienie iż duża część zlokalizowanych prac naukowych została wydana w Breslau a opisani badacze byli ściśle powiązani z Breslau poprzez edukację bądź poprzez pracę w ośrodkach w Breslau.
- Udowodnienie iż praca przedstawionych badaczy przyczyniła się do rozwoju badań nad korelacją mózgu i języka oraz dysfunkcjami mowy.

Dzięki niniejszej pracy przyszli badacze zainteresowani rozwojem neurojęzykoznawstwa będą mogli podczas swoich badaniach skorzystać z przedstawionego zbioru materiałów archiwalnych z Wrocławia i Niemiec oraz rozwinąć niniejsze badania poprzez zlokalizowanie innych materiałów dostępnych w bibliotekach na całym świecie. Niniejsza praca mogłaby być rozwinięta o dalsze przedstawienie badań które zapoczątkował Carl Wernicke i ich wpływowi na obecną wiedzę o ludzkim mózgu, mechanizmach nerwowych kontrolujących aktywność językową oraz o zmianach w mowie przy zaburzeniach pracy mózgu.

Dorobek Wernickego, jego studentów i współpracowników jest dobrze znany, natomiast współczesny kontekst - Uniwersytetu Wrocławskiego, szczególnie archiwalne dokumenty oraz przedstawione miejsca pamięci uczonych takie jak tablice okolicznościowe upamiętniających związek z Wrocławiem Otfrieda Foerstera i Aloisa Alzheimera, są bardzo istotne. Praca ta może zachęcić innych autorów do przeprowadzenia kompleksowej, pogłębiającej analizy dorobku wrocławskiej szkoły neurojezykoznawstwa. W pracy zgromadzone zostały źródłowe informacje pochodzące z bibliotek uniwersyteckich z Wrocławia, Berlina i z Frankurtu nad Menem, a także została omówiona neurolingwistyka z przedstawieniem jej rozwoju i życiorysami najbardziej znanych postaci, których osiągnięcia w badaniach nad funkcjami mózgu zostały utrwalone w piśmiennictwie jako wrocławska szkoła neuropsychiatrii. W pracy zostały również omówione najważniejsze fakty związane z historią Uniwersytetu Wrocławskiego i udokumentowane współczesne lokalizacje obiektów uniwersyteckich.

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