

УДК 612+612.8)(091)(092)

Anton M. L. COENEN

INTRODUCTION TO THE INAUGURAL LECTURE OF PROFESSOR ADOLF BECK GIVEN AT THE PHYSIOLOGY DEPARTMENT OF UNIVERSITY OF LEMBERG-LWÓW IN 1895

*Radboud University Nijmegen, The Netherlands
a.coenen@donders.ru.nl*

Exactly 120 years ago, Professor Adolf Beck (1863-1942), the founder of Physiology Department of the Lviv National Medical University who stood at the cradle of studies of the manifestation of the electrical brain activity, fought political discrimination and racism (anti-Semitism) on his way to becoming one of the 20th century's leading thinkers, delivered an inaugural lecture at the Physiology Department of the University of Lemberg-Lwów (nowadays Lviv National Medical University in Lviv, Ukraine). Unfortunately, it remains unknown to a wide medical audience in the 21st century.

Adolf Beck was a pioneer in the development and use of neurophysiological and psychophysiological methods for investigation of the cerebral cortex. Beck's fate was closely tied to the turbulent political and war history of Galicia, a region of the Austrian-Hungarian empire, and its two capitals, Krakau (nowadays Cracow) and Lemberg. He performed his influential electrophysiological work at the Jagiellonian University in Cracow and was invited to organize Physiology Department at the Medical Faculty in Lviv, where Dr. Beck became a professor of the Jan Kazimierz University in 1895. As professor of the Medical Faculty, he produced 180 publications and was nominated for the Nobel Prize in Physiology. Dr. Beck's initial interest was in the electrophysiology of the nervous system. In 1890, his article about the spontaneous and evoked electrical activity in the brain was published in the 'Centralblatt für Physiologie', a leading European Physiology magazine. Beck accurately localized sensory modalities of the cerebral cortex using electrical and sensory stimulation while recording electrical activities. In doing this, Beck also found the spontaneous oscillations of the brain potentials, and showed that these fluctuations were not related to heart and breathing rhythms, but had to be regarded as genuine electrical brain activities. In the 1890s Beck studied parts of the cerebral cortex that reacted to stimulation with electro-negativity, and was the first to record 'evoked potentials'. Moreover, Beck discovered a new element: a decrease in the amplitude of the potentials upon sensory stimulation. Thus, he was the first to describe the phenomenon, which is now known as the desynchronization of the EEG. It is important to note that Beck's research was not limited to neurophysiology, he also worked in the field of general Physiology, such as study of visceral and sensory functions, and laboratory medicine. However, Beck's groundbreaking work and ideas were

unknown to the wide scientific community for a long time due to various factors, including wars, political and ideological, grounds and restricted international contacts between different scientific groups. After the WWII, Adolf Beck was mainly disregarded until M.A.B. Brazier (1904–1995), neuroscientist, electroencephalographer, computer analyst, author and editor par excellence, international organizer, and a prominent expert in the history of neuroscience, translated Beck's dissertation into English (1973). Scientific views and perspectives of the great mind of Beck are again brought to the attention of contemporary scientists in the field of Physiology and Neuroscience. Thus, in this light, the publication of an English version of Beck's impressive inaugural lecture from 1895 "Life phenomena and their methods of investigation" (1895), which was first published in Polish, should be considered.

Key words: *: Adolf Beck; History of Medicine, Physiology, Neurophysiology, EGG.*

Антон М. Л. КОЕНЕН

ВСТУП ДО ІНАВГУРАЦІЙНОЇ ПРОМОВИ ПРОФЕСОРА АДОЛЬФА БЕКА НА КАФЕДРІ ФІЗІОЛОГІЇ ЛЬВІВСЬКОГО УНІВЕРСИТЕТУ В 1895 Р.

*Радбоуд університет Неймеген, Нідерланди
a.coenen@donders.ru.nl*

Рівно 120 років тому професор Адольф Бек (1863-1942), засновник кафедри фізіології Львівського національного медичного університету, який стояв біля витоків дослідження проявів електричної активності мозку, боровся з політичною дискримінацією і расизмом (антисемітизмом), і який став одним із провідних мислителів ХХ ст., вголосив свою інавгураційну промову на кафедрі фізіології Львівського університету (тепер – Львівський національний медичний університет імені Данила Галицького, м. Львів). Втім, він залишається невідомим серед широких медичних кіл ХХІ ст.

Адольф Бек був зачинателем розробки та використання нейрофізіологічних та психофізіологічних методів дослідження кори головного мозку. Доля А. Бека тісно пов'язана із буремними політичними та воєнними подіями в Галичині, регіоні Австро-Угорської імперії, та з її двома столицями – Краковом і Львовом. Він займався своїми впливовими електрофізіологічними дослідженнями в Ягелонському університеті в Кракові, потім його запросили відкрити кафедру фізіології на медичному факультеті Львівського університету, де д-ра Бека призначили на посаду професора Університету імені Яна Казимира у 1895 р. Як професор медичного факультету він написав 180 розвідок, його навіть номінували на Нобелівську премію з фізіології. Спочатку д-р Бек зацікавився електрофізіологією нервової системи. У 1890 р. його статтю про спонтанну та індуковану електричну активність мозку опублікувало видання «Centralblatt für Physiologie» - провідний європейський журнал з питань фізіології. А. Бек точно локалізував сенсорні модальності кори головного мозку шляхом електричного та сенсорного подразнення та записав електричну активність. Таким чином А. Бек також виявив спонтанні коливання біопотенціалу головного мозку та показав, що вони не пов'язані з частотою серцебиття та дихання, натомість їх варто вважати власною електричною активністю мозку. У 1890-х А. Бек вивчав частини кори головного мозку, які реагували на стимуляцію електронегативністю і першим зареєстрував «викликаний потенціал». Щобільше, А. Бек відкрив новий фактор: зменшення амплітуди потенціалів після сенсорної стимуляції. Таким чином, він був пер-

шим, хто описав явище, відоме зараз як десинхронізація ЕЕГ. Важливо зауважити, що дослідження А. Бека не обмежувалися нейрофізіологією, він також працював і у галузі загальної фізіології, досліджуючи вісцеральні й сенсорні функції, а також у лабораторній медицині. На жаль, інноваційні дослідження та ідеї А. Бека довгий час не були відомі широким науковим колам з різних причин, в т. ч. через війни, політичні та ідеологічні мотиви, а також обмежені міжнародні контакти між різними науковими групами. Після Другої світової війни дослідження Адольфа Бека залишались забутими, поки нейробіолог, спеціаліст з електроенцефалографії, провідий автор та редактор, організатор міжнародних заходів та видатний експерт в галузі історії нейробіології М. А. Б. Бразієр (1904–1995), не переклала дисертацію А. Бека англійською мовою (1973). Тож погляди і переконання великого мислителя А. Бека знову потрапити в поле зацікавлення сучасних науковців – фахівців з фізіології та нейробіології. Саме тому варто розглянути публікацію англійської версії вражаючої інавгураційної лекції А. Бека «Життєві явища та способи їх дослідження», яку він виступив у 1895 р., і яка вперше була опублікована польською мовою.

Ключові слова: Адольф Бек; історія медицини, фізіологія, нейрофізіологія, ЕЕГ.

INTRODUCTION

In May 1895, at the age of 32, Dr. Adolf Beck from Kraków accepted the offer to be appointed professor of physiology at the University of Lemberg in Lwów (now Lviv, Ukraine), at that time the capital of Galicia in the Austro-Hungarian Empire (former Poland

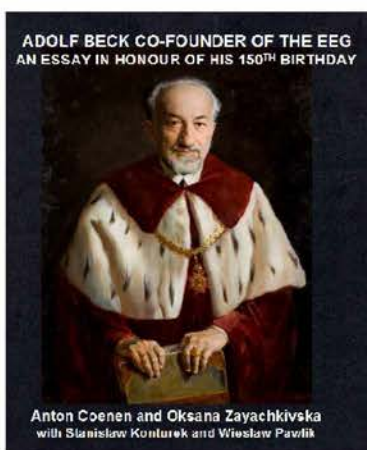


Fig. 1. Cover page of book dedicated 150 anniversary of A. Beck. Professor Adolf Beck in rectoral robes wearing the ring presented to him in honor of 40 years of service to the University of Lwów.

Beck holds the textbook written together with professor Napoleon Cybulski in his hands.

The was done by Stanisław Kaczór-Batowski in 1935 (from the National Museum in Kraków).

from 1919 to 1939). Who was this young professor? Born in Kraków on 1 January 1863 in a Yiddish-speaking sober living family of a Jewish baker, Adolf Beck graduated from

the gymnasium of Św. Jacek in his birthplace in 1884. Then he enrolled as a student in the Jagiellonian University where he studied medicine from 1884 to 1889. Under supervision of the famous professor Napoleon Cybulski, he graduated cum laude to become a medical doctor in 1890. In his influential dissertation and interest-evoking papers, Beck described as one of his first researchers the recordings of the electrical brain activity of animals. This work led to the view that understanding the functioning of the brain can be obtained by studying its electrical activity. The research of Beck was regarded so valuable that nowadays he is still recognized as one of the co-founders of the electroencephalogram (EEG). The scientific activity of Beck was not limited to electrophysiology but had wide ranges in the fields of general physiology. In 1894 he got his 'venia legendi' ('Habilitation') in Physiology at the Jagiellonian University with a thesis titled 'Changes in blood pressure in vessels'. Given all his important achievements at the University of Kraków it was not surprising that a professorate was soon offered!



Fig. 2. In the archives of the Kraków administration, the birth of a certain Abraham Chaim Beck was registered on January 1, 1863 at the address: District VI, No. 45. The change of his first name Abraham into Adolf is mentioned in an additional note, undersigned by father Szaja Dawid Beck and mother Gustawa Müller.

After his appointment to the position of a Professor at the University of Lemberg, Beck started building up the new Department of Physiology at the Medical Faculty with energy and enthusiasm. He organized this department in a similar style as in his Alma Mater. Beck started to equip a physiological laboratory with the newest devices for registration of brain activity. Except the main direction of electrophysiology and neuroscience, his interests included many other aspects of physiology. Creating the department of physiology with a wide expertise, Beck succeeded to form a staff specializing in different aspects of physiology. Moreover, teaching and education were important issues for Beck and he appreciated direct contacts with his students. He promoted teaching of physiology by experimental demonstrations. For this purpose, he equipped the lecture hall with an expensive multifunctional time projector, ensuring that he could demonstrate the dynamics of physiological processes live. In his role of a teacher and researcher, Beck created

the famous School of Physiology at the University of Lemberg, which has delivered many prominent physiologists.



Fig. 3. Adolf Beck as a young man at the time when he was appointed to the position of a professor at the University of Lemberg. 1894.

In October 1895, Beck gave his inaugural lecture, translated later into English, 'The phenomena of life and the ways of investigating them'. In his maiden speech, he announced his plans with respect to the research topics, strategies, innovations, and teaching approaches. He did this by starting from a philosophical-historical perspective, but then translated his views into pragmatic and feasible approaches. Years later, he revealed to his second daughter Jadwiga Beck-Zakrzewska how important this first lecture as a Professor was for him, and how long he had worked on it. His success at the University of Lwów demonstrated his visionary views. He performed and published multiple experiments and gave many lectures in front of a full lecture hall. It was nevertheless unavoidable that this intelligent, wise and visionary man soon was offered the position of the Dean of the Medical Faculty. That was in the period of

1904-1905; his appointment to the position of the Rector of the University followed years later, in 1912-1913.

The turbulent history of Lemberg-Lwów-Lviv is reflected in the life of Adolf Beck. The relative peace in Galicia disappeared with the start of the World War I when its capital, Lwów, was occupied by Russian troops. That was in 1914, during Beck's second term as a Rector. Beck did everything in his power to preserve all possessions of the university in order to continue scientific work and education. However, this came to an end when Professor Beck, together with many other leading scientists and representatives of the city, was arrested by the Russian army and imprisoned in a camp in Kyiv. Due to the efforts of the Russian Nobel laureate Ivan Pavlov, a friend of Beck's teacher Cybulsky, Beck was released in August 1915 and arrived



Fig. 4. Adolf Beck as the Dean of the Medical Faculty of the University of Lwów in 1904.

back in Lwów after a long travel in 1916. He became the Dean of the Medical Faculty again, from 1916 to 1917. World War I ended with a collapse of the Habsburg, the German and the Russian empires and the consequence was that an independent Poland came into

being. This happened in 1919. In this glorious year for Poland, Beck lost his mentor and friend Napoleon Cybulski, with whom he had performed many valuable experiments and written an important textbook on human physiology.



Fig. 5. *Left photo:* Adolf Beck (*on the left*) and Napoleon Cybulski (*on the right*) writing the textbook „Fizjologia człowieka“ („Human Physiology“). This book appeared in 1915 and was a popular must-read among medical students. The photo was made in 1911 at Beck’s old department at the Jagiellonian University in Kraków. *Right:* Adolf Beck (*front row left*) and his closest colleague Gustav Bikesles (*front row middle*) photographed around 1918 during their electrical brain recordings of a rabbit at the Department of Physiology of the University of Lemberg.

A period of intensive research and delivering lectures followed along with the leadership at the Department of Physiology. Beck was deeply involved into scientific life and conducted many interesting practical courses. Beck was an enthusiastic teacher and his students liked him. All the time he lived in Asnyka street, 4 (presently Bohomoltsia St., 4) in the shadow of the university. He did his scientific writings mostly at home. Despite all his scientific endeavors, Beck had a strong family and social life. He was interested in music and played violin and was accompanied by his wife playing the piano. In 1932, Beck retired and gave the leadership of the Department to his former student Wiktor Ty-chowsky. In 1935, he received an honorary degree for his high merits during his 40-year long affiliation with the University of Lwów. Moreover, he received several titles and awards from scientific societies and institutions. Dramatic were the deaths of his oldest daughter Zofia and his wife Regina Mandelbaum in 1939. Despite these tragic incidents, at 76, Adolf Beck was in a good mental spirit and a brilliant speaker, often at work for his previous department.

Then came the World War II. Life for Beck became even more troubled and dangerous than during the World War I. The dramas of the Beck family started with the arrest professor Kazimierz Zakrzewski, the husband of Beck’s second daughter Jadwiga, by the Gestapo, and his subsequent execution in Palmiry at the beginning of 1941. In Lwów, Beck himself was in great danger. Nazis occupied the city and Beck, who was of Jewish origin, suffered much humiliation. When the extermination of the Jews started and it be-



Fig. 6. This photo shows Adolf Beck (the second person on the left in the second row), together with other hostages of the Russian Army 10 years after their release from their imprisonment in Kyiv. 1925.

came too dangerous, Beck was brought by his son Henryk and former colleague Zdzisław Bieliński to a hiding place at the Aryan side of the city. However, just before his 80th birthday, Beck was betrayed and Henryk could just hand his father a capsule with cyanide giving him the opportunity to commit suicide before the Nazis could send him to the gas chamber. In the chaos of Beck’s arrest, eyewitnesses Henryk and Bieliński could escape but died shortly thereafter. Bieliński was killed by an explosion and Henryk Beck died of a heart failure in 1946, after his life threatening struggle in the Warsaw Uprising. Hence, the exact day of Beck’s death in August 1942 got lost and it is not known where he is buried or where his grave is. Jadwiga finished her daughter’s memoirs to her father as follows:



Fig. 7. This picture of the grave of Adolf Beck’s son Henryk who is buried together with his wife Jadwiga z Trepków Beckowa is a tribute to the unknown graveyard of Adolf Beck. The only survivor of the Beck’s family was his daughter Jadwiga Beck-Zakrzewska (born 1901), who died at an old age in Kraków. Her son, Bogusław Zakrzewski, Beck’s only grandson, passed away being childless.

‘His death was painfully tragic: in 1942, in Lwów, when this magnificent, strong man had reached the age of 80, after a beautiful and dedicated life, he took poison at the moment when the Germans came for him’.

This year 2015 marks 120 years of Adolf Beck’s appointment to the position of professor at the University of Lemberg-Lwów and beginning of his impressive career with his inaugural lecture. In fact, he had already developed a methodology for brain research in his graduation work in Kraków. In Lwów, he made some new findings with the help of EEG technique, a technique that is presently still one of the most applied methodologies for brain investigation. However, Beck has not obtained full credits for his research, although he was nominated for the Nobel Prize three times. After World War II, the eastern part of Galicia with Lwów, now Lviv, was annexed by the Soviet Union. Unfortunately, the regime in Moscow shut down the electrophysiological research, a type of research that earlier had blossomed in Eastern Europe with leading researchers such as Beck in Lwów, Cybulski in Kraków, Práwdicz-Neminsky in Kyiv, and Danilewsky in Kharkiv. The Soviet regime, however, opted for Pavlov’s concept, better fitting its concepts and ideas. This led to an ongoing neglect of physiologists studying electrical brain functions, while West-European scientists working in these fields could no longer have direct contacts with their East-European colleagues, implicating that their research slowly fell into oblivion, not only in Western Europe but also in the countries where they worked. This oblivion happened also to Beck and his work.

Nowadays, Adolf Beck attracts more and more attention as a great scientist. Interest began to rise when the expert in the history of electrical brain recordings, the late English professor Mary A.B. Brazier (1904-1995), translated Beck’s dissertation from Polish into the English language. However, this result was not yet too impressive. When I began electrophysiological research in the beginning of the sixties (in 1963, I performed my first electrical recordings on cockroaches, and later on cats and rats using self-made microelectrodes), I was highly interested in brain recording methodologies and techniques. From Mary Brazier, I learned more about these techniques and so I came to the trace of Beck. When I got a Polish student from Kraków, Jan Kaiser, who later became a professor at the Jagiellonian University, I started my frequent visits to the Jagiellonian University, where I later became a visiting professor. To my surprise, work and personality of Adolf Beck was not more than a footnote in electroencephalography. In order to collect more information on Beck, I travelled to Lviv in October 1996, a little more than 100 years later than Beck. At the university there, I met Professor Oksana Zayachkivska, who appeared to be a Beck-expert, with a ready collection of relevant information. This meeting launched an additional search for new historic and documentary material about the outstanding person-

ality of Adolf Beck. The result was that several publications by us have already shed some light on scientific and daily life, as well as on the character, of this great scientist, teacher and man (Coenen & Zayachkivska, 1998-2013). It is in this light that the publication of an English version of Beck's impressive inaugural lecture from 1895 prepared by Prof. O. Zayachkivska must be considered. Scientific views and perspectives of the great mind of Beck are again brought to the attention of contemporary scientists in the field of Physiology and Neuroscience.

REFERENCES

1. Coenen A, Fine E, Zayachkivska O., 2014. Adolf Beck: A Forgotten Pioneer in Electroencephalography. *Journal of the History of the Neurosciences*. 3, 23(3), 276–86.
2. Coenen A, Zayachkivska O, Bilski R., 1998. In the footsteps of Beck: the desynchronization of the electroencephalogram. *Electroencephalography and clinical Neurophysiology*. 30, 106(4), 330–5.
3. Coenen A, Zayachkivska O., 2013. Adolf Beck: A pioneer in electroencephalography in between Richard Caton and Hans Berger. *Advances in Cognitive Psychology*. 9(4), 216.
4. Coenen AM, Zayachkivska O., 2013. Adolf Beck, Co-Founder of the EEG: An Essay in Honour of his 150th Birthday. Gaj K, editor. Department of Physiology of the Jagiellonian University Medical College.
5. Zayachkivska O, Gzhegotsky M, Coenen A., 2012. Impact on electroencephalography of Adolf Beck, a prominent Polish scientist and founder of the Lviv School of Physiology. *International Journal of Psychophysiology*. 31, 85(1), 3–6.
6. Zayachkivska O, Gzhegotsky M, Coenen A., 2013. The contribution of Adolf Beck to Physiology (to 150-anniversary from his birth). In *Proceedings of The Physiological Society*. The Physiological Society.
7. Zayachkivska O., 2013. *The world of Adolf Beck by eyes of Henryk Beck: total unofficial*, Lviv, BaK.

Стаття надійшла 25. 10. 2015
Після доопрацювання 06. 11. 2015
Прийнята до друку 15. 12. 2015