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THE CONTRIBUTION OF POLISH SCIENTISTS TO THE DEVELOPMENT OF MEDICINE*

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Abstract. This article traces the contribution of Polish scientists and physicians to the development of world medicine, from the Renaissance to the twentieth century. Beginning with Wojciech Oczko's pioneering work in balneology and health education, the paper follows a line of researchers whose discoveries reshaped clinical practice and public health well beyond Poland's borders. Among them are Ignacy Łukasiewicz, whose kerosene lamp enabled the first documented night-time surgery; Napoleon Cybulski, discoverer of adrenaline; Ludwik Hirszfeld, co-creator of the ABO blood-group system; Rudolf Weigl, inventor of an effective typhus vaccine; Marie Skłodowska-Curie, twice a Nobel laureate and pioneer of radiotherapy; and Hilary Koprowski and Albert Sabin, whose oral polio vaccines saved millions of children worldwide. The article argues that Polish medicine's contribution to global science is not a series of isolated episodes, but a continuous tradition, repeatedly obscured by partition, war, emigration, and what may be called the "dispersal of scientific identity": the tendency of international scholarship to detach a researcher's achievements from their national origin. Drawing on the Talmudic principle that whoever saves one life saves the entire world, the paper situates these biographies within a broader reflection on memory, identity, and the ethics of medical science.

Keywords: history of medicine; Polish science; biomedical discoveries; public health; national identity in science.

INTRODUCTION

"Whoever saves one life saves the entire world", a line from the Talmud, popularised by the Australian novelist Thomas Keneally in Schindler's

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Ark (1982), the book behind Spielberg's Schindler's List. It is often invoked in medical ethics, and it gains a particular weight once we look at the people who, in laboratories and hospital corridors, quietly rewrote the fate of humanity. Polish culture has its own mirror of that thought: "You praise what is foreign, and don't know your own," a proverb attributed to Stanisław Jachowicz. It is both a warning against blind admiration of the foreign and a bitter comment on our own forgetfulness. And yet Polish soil produced scholars, physicians, and researchers whose work crossed borders, cultures, and eras, weaving itself into the history of world medicine.

Cyprian Kamil Norwid wrote of Chopin: "Polish at heart, a citizen of the world by talent." Though aimed at music, the phrase offers a universal key: Polishness as the soil from which a contribution to global heritage grows. The same pattern fits science at least as well as art, science, like music, speaks a supranational language, yet needs a concrete voice, a concrete accent. That is exactly what characterises the Polish contribution to European and global medicine.

Too often the nationality is quietly dropped. Marie Skłodowska-Curie is presented in Western sources simply as a French scientist; Albert Sabin as an American virologist; Ludwik Hirszfeld as a European-class researcher with no mention of his Lwów or Warsaw roots. Call it "the dispersal of scientific identity", a pattern especially common among scholars from East-Central Europe, whose biographies were repeatedly cut across by partitions, migration, and war.

The history of medicine in Poland is not a peripheral one. From Renaissance physician-humanists to twentieth-century immunologists and virologists, Polish scholars helped build foundations that still shape the global system of public health today. Wojciech Oczko, physician to two kings, wrote about hygiene, hydrotherapy, and prevention before "public health" existed as a concept. Jędrzej Śniadecki, author of the first Polish chemistry textbook, treated medicine as a field uniting natural philosophy with clinical empiricism. Ignacy Łukasiewicz, a Galician pharmacist who built the kerosene lamp, lit operating theatres across Europe and laid groundwork for the pharmaceutical industry. Most drugs today still rely on raw materials derived from the petroleum sector he helped create. Zygmunt Wróblewski and Karol Olszewski were the first in history to liquefy oxygen and nitrogen, making modern anaesthesiology and cryotherapy possible. Jan Mikulicz-Radecki developed the cotton surgical glove and the principles of asepsis; Napoleon Cybulski discovered adrenaline; Ludwik Hirszfeld laid the foundations of serology and blood groups. And Rudolf Weigl and Hilary Koprowski, inventors of vaccines that saved millions, gave living form to the old line: whoever saves one life saves the entire world.

Polish medicine developed for centuries under conditions of political instability, partition, and war. What follows is not merely a roll call of names – although the list could, and should, be far longer – but an attempt to reconstruct a memory: to show how this homegrown contribution co-shaped the world's systems of health, diagnostics, and prevention. From Oczko to Koprowski, from empirical observation to biotechnology. Knowledge born on Polish soil reshaped how we understand the human body and human life. As Norwid put it, "the homeland is a great, collective duty." And science, especially the kind that heals and saves, is its purest fulfilment.

1. WITELON, VITELO, VITELON (1230-1314)

A Silesian philosopher, mathematician and natural scientist, remembered for the ten-volume *De Perspectiva* (1270-1273). Its third book is devoted to the anatomy and physiology of the eye. The treatise's rigour earned it lasting popularity among scholars in Poland and abroad; it was studied closely by both Copernicus and Leonardo da Vinci [Łyskanowski 1976, 491].

2. JAN STRUŚ (1510-1568)

Born in Poznań and trained in Padua, Struś became court physician to Princess Isabella Jagiellon, daughter of Sigismund I. His fame reached as far as Turkey, where he successfully treated Sultan Suleiman the Magnificent. His work on the physiology of the heart and blood vessels, including graphic representation of the pulse and early designs for a sphygmograph – fed into his book *Sphygmacae artis libri V*, published in Basel and reprinted several times. He is regarded as a forerunner of the circulatory science later developed by William Harvey [Łyskanowski 1976, 491-92].

3. WOJCIECH OCZKO (1537-1599)

Renaissance medicine still rested largely on experience, tradition, and master-to-pupil transmission. Into that world stepped Wojciech Oczko, educated in Warsaw and Kraków, who completed his medical doctorate in Italy in 1565. Back in Poland he rose quickly: physician at Warsaw's St Martin's Hospital from 1569, court physician and secretary to King Stefan Batory from 1576, later serving Sigismund III Vasa too. His royal access had practical consequences, on the king's orders, he studied the healing properties of mineral springs at Szkło and Jaworów (now in Ukraine).

His most important book, *Cieplice* (1578), was a pioneering work on balneotherapy, written in Polish, a symbolic starting point for Polish balneology

[Obarska 2022]. In *Przymiot albo Dworska Niemoc* (1581) he tackled syphilis, then a plague across Europe, analysing causes and symptoms and criticising the overuse of mercury in treatment, a notably unconventional stance for his time [Janicki 2020].

Oczko held that physical activity, proper diet, and rest were the basis of health, and is credited with the line: "Movement can replace almost any medicine, but no medicine can replace movement."[1] In the sixteenth century he was already linking medicine with lifestyle and health education (what we now call public health) and even praised the peasant way of life as healthier than the aristocratic one [ibid.]. It is worth noting that in 2016 the WHO formally recommended physical activity as a core element of a healthy lifestyle, a principle now built into Poland's national nutrition pyramid [Jarosz 2016, 77-84].

His influence travelled well beyond Poland: an early case of medical knowledge export, fusing Italian training with local Polish conditions. Writing in Polish, he also expanded the country's medical vocabulary, giving later generations a starting vocabulary of their own. He died in Lublin in December 1599 (some sources say January 1600), leaving behind balneology, health education, and practical medicine as fields he helped define,[2] proof that sixteenth-century Poland was already a site of pioneering medical work with real European reach.

4. JAN JONSTON (1603-1675)

Jan Jonston, a physician, naturalist and philosopher from a Scottish family settled near Szamotuły. His widely circulated works: *Idea universae medicinae practicae* (1644), the two-volume *Historia naturalis* (1650-1653), and *Syntagma universae medicinae practicae* (1673), served generations of European physicians [Łyskanowski 1976, 492].

5. JĘDRZEJ ŚNIADECKI (1768-1838)

Born as the First Polish Republic was collapsing under internal crisis and foreign pressure, Śniadecki grew up understanding science as a form of national survival. In 1797 he became professor of chemistry at Vilnius University, lecturing in Polish - in itself a patriotic statement under partition [Nowak, Żmudzińska-Żurek, Rutkowski, et al., 2023, 31-32]. His textbook *Początki chemii* (1800) was the first Polish-language academic chemistry

[1] See https://balneologia.org.pl/medal-oczki/ [accessed: 24.10.2025].

[2] See https://ryneklubelski.pl/2014/07/slawni-lubelscy-lekarze-przelomu-xvi-xvii/ [accessed: 26.10.2025].

book, helping popularise science in the national tongue at a moment when language itself was a nation-building tool [Filipiak 2024]. In his major theoretical work, *Teorya Jestestw Organicznych* (1804), he proposed a striking definition of life centred on metabolism, the constant exchange of matter between organism and environment.[3] As a clinician, Śniadecki developed an early modern theory of nervous-system function, and from 1822 treated rickets through increased sunlight exposure, an early instance of preventive medicine (helio-therapy's clinical efficacy was later confirmed experimentally by another Polish scholar, the Lwów paediatrics professor Jan Raczyński) [Łyskanowski 1976, 493]. His textbooks were translated into German and French, and his Vilnius lectures entered the European scientific circuit at a time when Poland had no statehood of its own – writing and teaching in Polish was itself an act of preserving national identity [Wacławek and Wacławek 2006].

6. MOJŻESZ BEISER (XIX CENTURY)

Documentation on Beiser is thinner than for other figures here, but his biography offers a glimpse of the physician as civic actor in the multicultural medicine of nineteenth-century Galicia. Trained in Vienna, he practised in Lwów, where his work earned him the title of honorary citizen and a seat on the city council, modest evidence, but real evidence, of the everyday work that built local health systems and community trust across multilingual, multi-ethnic Central-Eastern Europe [Beiser 1881].

7. ADAM RACIBORSKI (1809-1871)

Born in Radom, Raciborski emigrated to Paris after the November Uprising. His manual on auscultation and percussion, *Nouveau Manuel Complet de Auscultation et de Percussion* (1835), was translated into several European languages and preceded the analogous textbook by Josef Škoda by four years. He also edited, for two years, the Polish-language yearbook of the Society of Polish Physicians in France [Łyskanowski 1976, 505].

8. IGNACY ŁUKASIEWICZ (1822-1882)

A pharmacist from Galicia, Łukasiewicz is remembered above all for inventing the kerosene lamp (1853) and building the world's first oil well (1854) and refinery (1856) [Kępa 2022]. His chemistry, though, had a direct medical dimension. Working with Jan Zeh in the Lwów pharmacy "Pod Złotą Gwiazdą,"

[3] See https://www.panteonnarodowy.org/wielcy-polacy/42-jędrzej-śniadecki [accessed: 25.10.2025].

he distilled petroleum into a fraction that burned cleanly, brightly, and cheaply. As a result of this work, a kerosene lamp was created, designed together with the tinsmith Adam Bratkowski [Nowak, Żmudzińska-Żurek, Rutkowski, et al., 2023, 39-40].

On the night of 31 July 1853, a Lwów hospital used Łukasiewicz's lamps to light an operating theatre for what is recorded as the first night-time surgery in clinical history.[4] English-language sources, too, treat the invention as a genuine contribution to the development of hospital care worldwide.[5] Why does this matter medically? Lighting an operating theatre after dark meant longer clinical hours, better visibility during procedures, fewer surgical errors, and access to life-saving interventions outside daylight hours. Surgery, from this point on, was no longer tied to the sun.

9. LUDWIK TEICHMANN (1823-1895)

Born in Lublin, educated in Heidelberg and Göttingen, Teichmann became professor of pathological anatomy at the Jagiellonian University in 1861. He devised one of the first (and for decades the only) methods for detecting blood in suspicious stains, a breakthrough for forensic medicine [Nowak, Żmudzińska-Żurek, Rutkowski, et al., 2023, 44]. Publishing in the German journal *Neue Folge*, he described a procedure for obtaining a crystalline substance from red blood cells, which he named *hemin* (Teichmann's crystals); follow-up papers in 1853 and 1857 turned this into a standard test used in forensic science for many years [Łyskanowski 1976, 497-98].

10. JAN BALIŃSKI (1827-1902)

A grandson of Jędrzej Śniadecki, Baliński played a key role in the development of Russian psychiatry. After graduating in Petersburg in 1846, he became the first person in Russia to lecture on psychiatry as an independent medical field, and in 1861 opened a modern psychiatric clinic equipped with chemical, psychological, histological and physiological laboratories along with an electrotherapy unit, a major step toward treating psychiatry as part of integrated medical science [ibid., 507].

[4] See https://www.europesays.com/1955932/ [accessed: 24.10.2025].

[5] See https://www.ogj.com/home/article/17215681/first-kerosine-lamp [accessed: 25.10.2025].

11. KSAWERY GAŁĘZOWSKI (1832-1907)

An internationally renowned ophthalmologist, trained in Petersburg and (after having to repeat his medical studies) in France, where he earned a second doctorate in 1865. In 1903 he devised a novel treatment for retinal detachment using thermal coagulation, though the method was only popularised 26 years later by the Swiss ophthalmologist Jules Gonin, who is usually credited with introducing it into clinical practice. Gałęzowski trained a generation of French ophthalmologists while keeping close ties to Poland, publishing regularly in Polish [ibid., 504-505].

12. GUSTAW PIOTROWSKI (1833-1884)

Discoverer of the biuret reaction, the colour-change test that identifies peptide bonds in proteins via copper (II) ions, which he carried out and described in 1857. After several years of research travel abroad, he returned to Poland in 1859 to take up a post in physiology at the Jagiellonian University, becoming full professor the following year [ibid., 498].

13. HENRYK FRYDERYK HOYER (1834-1907)

A leading figure of the Warsaw biological school, Hoyer carried out pioneering studies on the microstructure of blood vessels, describing direct connections between arterioles and venules - important for understanding microcirculation. He also studied connective tissue, including nerve endings in stratified squamous epithelium, and clarified the role of bone marrow in blood formation, laying groundwork for modern histopathology and haematology [ibid., 500-501].

14. JAN LUCJAN MIERZEJEWSKI (1839-1908)

Baliński's successor in Russian psychiatry. Born in Jędrzejów, schooled in Lublin, and trained in Petersburg (1861), he became head of a psychiatric clinic in 1877 and pursued the conviction that psychosis had somatic, histopathological roots [ibid., 507-508].

15. ZYGMUNT WRÓBLEWSKI (1845-1888) AND KAROL OLSZEWSKI (1846-1915)

At a moment when Poland did not exist on any map, these two scientists changed the rules of physics and chemistry – and, indirectly, of medicine's technological possibilities – by liquefying oxygen and nitrogen in the laboratory, in April 1883: arguably one of the most significant Polish scientific achievements of the era [Tomala 2013].

Wróblewski, born in 1845 in Grodno, took part in the January Uprising, was exiled to Siberia, and afterwards studied physics and chemistry in Berlin and Munich [Przygodzki 2013] before taking the physics chair at the Jagiellonian University in 1882. Working with Olszewski, he liquefied oxygen on 5 April 1883 and nitrogen eight days later – gases no one had previously managed to keep liquid under laboratory conditions, an achievement demanding both apparatus precision and a deep grasp of thermodynamics and cryogenics [Nowak, Żmudzińska-Żurek, Rutkowski, et al. 2023, 13-16].

Olszewski, born in 1846 near Ropczyce and a Jagiellonian professor from 1876, co-developed with Wróblewski a cascade method of liquefaction that became foundational to cryogenics and industrial refrigeration [Kuryło 2025]. He went on to liquefy and solidify argon in 1895 and set up an X-ray laboratory in Kraków in 1896.[6]

The medical implications of their work was substantial: liquid oxygen became central to oxygen therapy and surgery, enabling sterile precision work and respiratory support in difficult conditions. Their research began in physics, but its applications soon belonged to medicine. Even with no state of its own, Poland could compete with the best European laboratories, a proof that under political and material constraint, Polish science still achieved institutional and technological excellence with global consequences [Nowak, Żmudzińska-Żurek, Rutkowski, et al. 2023, 13-16].

16. TADEUSZ BROWICZ (1847-1928)

Professor of pathological anatomy at the Jagiellonian University, Browicz is remembered as discoverer of the typhoid bacillus (*Salmonella enterica*). His 1874 paper *Pasorzyty roślinne w durze jelitowym* described the bacterium responsible for the disease six years before Karl Eberth, of Zurich, published an equivalent finding – yet for decades foreign textbooks credited Eberth as the discoverer.

Browicz also studied malaria (1874), and in 1898 described stellate cells of the liver's reticuloendothelial system, now known as Browicz–Kupffer cells, a key

[6] See https://www.panteonnarodowy.org/wielcy-polacy/25-karol-olszewski [accessed: 26.10.2025].

contribution to hepatology. He also co-authored the 1905 *Słownik lekarskiego polskiego*, helping build Polish medical terminology [Łyskanowski 1976, 493-94].

17. JAN MIKULICZ-RADECKI (1850-1905)

Born in Czerniowce to a Polish noble family, Mikulicz-Radecki built his career across the Austro-Prussian-German world, studying surgery in Vienna under Theodor Billroth. He became one of the founders of modern European surgery, although his Polish roots are rarely mentioned. He led surgical clinics in Kraków (1882-1887), then Königsberg, then Breslau (today's Wrocław) until his death in 1905, pioneering technique after technique: closure of a perforated gastric ulcer (1885), partial oesophageal reconstruction (1886), early endoscopy with a lit oesophagoscope/gastroscope, surgery during active gastric haemorrhage, osteoplastic foot resection advancing reconstructive orthopaedics, and a finger-dilation method for cardiospasm. In 1887, working independently of Heineke, he performed a pyloroplasty now known as the Heineke–Mikulicz operation; in 1898 he modified Billroth's gastrectomy into what became the Krönlein–Mikulicz operation; he also devised the Paul–Mikulicz technique for the colon [Kuczkowski, Stankiewicz, Plichta, et.al. 2012, 1999-2001].

He developed principles of plastic nasal surgery, pioneering facial reconstructive techniques, described a disease of bilateral lacrimal and salivary gland enlargement now called Mikulicz's disease, and identified Mikulicz cells found in scleroma [Łyskanowski 1976, 499]. Crucially, he was among the pioneers who pushed asepsis and antisepsis into the operating theatre – surgical masks, gloves, instrument sterilisation, now basic standards, were once his innovations, with a direct effect on reducing post-operative complications and mortality [Stawarz-Janeczek, Muszyńska, and Pytko-Polończyk 2021, 132-36]. He effectively built a Polish school of surgery whose graduates spread across Europe; one contemporary called him simply "a king in the kingdom of surgeons" [Kielan, Łazarkiewicz, and Grzebieniak et al. 2005, 1-7].

18. LUDWIK RYDYGIER (1850-1920)

Rydygier succeeded Mikulicz-Radecki at the Jagiellonian chair of surgery and is regarded as one of the finest general surgeons of his generation. In 1880 he performed and meticulously documented a pyloric resection for gastric cancer – the second such operation in the world after Jules Péan's in 1879, though Rydygier's account carried far greater scientific value. The patient died, however, so the procedure never entered the literature as "Rydygier's method." In 1884 he proposed a gastrojejunostomy technique for treating peptic ulcer disease [Łyskanowski 1976, 500].

19. NAPOLEON CYBULSKI (1854-1919)

Born in 1854 in the Vilnius governorate (now Belarus), Cybulski studied medicine in St Petersburg under Ivan Tarchanov, focusing on circulatory physiology.[7] In 1885 he took the physiology chair at the Jagiellonian University, where his work made him a forerunner of both endocrinology and electroencephalography [Grzybowski and Pietrzak 2013, 2942-943].

His greatest discovery – isolating a substance from the adrenal medulla in 1895 ("suprarenin," later adrenaline) – opened a new era in which hormones came to be understood as fundamental regulators of life [Kępa 2021]. He also built a device for measuring blood-flow velocity and, with Adolf Beck, developed a method for analysing electrical brain waves (EEG) [Pawlik, Konturek, and Bilski 2006, 107-18].

His Kraków school trained generations of scientists, and his four-volume *Fizjologia człowieka* became a foundation text for Polish and international physiology.[8] His discovery of adrenaline had near-immediate clinical reach: anaphylactic shock treatment, surgery, anaesthesia, diagnostics – proving that scientific influence need not flow only from Berlin or Paris, it could also originate in Kraków and spread from there outward.

20. JÓZEF BABIŃSKI (1857-1932)

Born in Paris to political émigrés who deliberately preserved their Polish language and culture, Babiński completed his medical degree in Paris (1879) and doctorate in 1885, becoming head physician at the Hôpital de la Pitié in 1890. He devised a systematic neurological examination method distinguishing functional from organic symptoms and introduced the concept of the clinical syndrome. His best-known contribution is the description of the plantar reflex (the Babinski sign), indicating pyramidal-tract damage. He also studied tendon and periosteal reflexes, hemiplegia, cerebellar disease and neuropsychiatric disorders including hysteria, and was among the early advocates of surgical intervention for selected central-nervous-system diseases - a major influence on modern neurology and neurosurgery [Łyskanowski 1976, 504].

21. ODO BUJWID (1857-1942)

One of Poland's leading bacteriologists and a pioneer of hygiene and preventive medicine, Bujwid trained under Robert Koch in Berlin and at the

[7] See https://wl.uwm.edu.pl/kfc/dzialalnosc-naukowa/pioneers-neuroscience-poland/napoleon-cybulski [accessed: 25.10.2025].

[8] Ibid.

Pasteur Institute in Paris. In Warsaw he founded the second rabies vaccination institute in Europe, later setting up similar facilities in Petersburg, Kyiv and Odesa, a substantial contribution to vaccinology in the region. In 1890 he independently obtained a tuberculin filtrate from tuberculosis-bacillus cultures, a year before Robert Koch announced the same substance as a new TB therapy, Bujwid's filtrate found use in diagnostics, a real contribution to microbiology and immunology [Łyskanowski 1976, 494-95].

22. ADOLF BECK (1863-1942)

A physiologist who continued Napoleon Cybulski's work on the nervous system, Beck focused on the brain's bioelectric activity. His experiments showed that electrical currents in different regions of the cortex varied by location and stimulus type, leading him to conclude that different brain regions had distinct functions. His 1891 paper, *Oznaczenie lokalizacji w mózgu i rdzeniu za pomocą zjawisk elektrycznych*, presented these pioneering findings, which (together with Cybulski's parallel work) laid groundwork for modern electroencephalography [ibid., 496].

23. EDMUND BIERNACKI (1866-1911)

One of the finest Polish pathologists at the turn of the twentieth century, trained in Warsaw and at top European clinics in Heidelberg and Paris before relocating, under growing Russification pressure, from Warsaw to Lwów in 1902. His research spanned neurology, cardiology, infectious disease and haematology. Biernacki was the first to describe red-cell sedimentation and to formulate the laws governing it, publishing in 1897 on the clinical use of erythrocyte sedimentation rate (ESR). The test, known in Poland as the Biernacki reaction (OB), became one of the oldest and most widely used markers of inflammation, infection and chronic disease activity, prized for its simplicity and accessibility [Łyskanowski 1976, 493].

Despite the breakthrough, Biernacki was almost entirely forgotten outside Poland. In 1918, the Swedish researchers Robert Fåhraeus and Alf Westergren independently observed the same phenomenon; though they eventually acknowledged the Pole's priority, international literature for years credited them with the discovery instead [Fedorowicz and Fedorowicz 2017, 285-92].

24. MARIA SKŁODOWSKA-CURIE (1867-1934)

Born in Warsaw, then under Russian partition, to a family of teachers, Maria Skłodowska showed early scientific talent but faced real barriers

– women could not study at the University of Warsaw.[9] In 1891 she moved to Paris and, as Marie Curie, enrolled at the Sorbonne, earning a physics licentiate in 1893 and a mathematics one in 1894.[10]

Her career is the clearest possible example of a "Polish voice" becoming a global movement. Inspired by Henri Becquerel's 1896 discovery of radioactivity, she and her husband Pierre Curie showed that radioactivity was not unique to uranium, leading to the discovery of polonium (1898) and radium.[11] In 1903 she shared the Nobel Prize in Physics with Pierre and Becquerel, in 1911 she won the Chemistry Nobel alone – the first person ever honoured in two different scientific disciplines.[12] This double achievement is widely glossed over abroad, where she is often described simply as a French scientist of Polish origin, if her Polish background is mentioned at all.

The medical significance is enormous: the discovery and isolation of radium enabled the development of cancer radiotherapy, radiological diagnostics, and the early stages of nuclear medicine. Tellingly, she named one of the elements "polonium" – Polish identity and global scientific achievement fused into a single name,[13] the first time in history an element's name carried explicit political meaning, honouring a country then erased from the map [Fedorowicz and Fedorowicz 2017, 243-54].

25. EDWARD FLATAU (1868-1932)

Born in Płock and trained in Moscow and Berlin before settling in Warsaw, Flatau co-shaped world neurology [Triarhou 2007]. His 1894 *Atlas des menschlichen Gehirns und des Faserverlaufes* became one of the foundational neuroanatomical works of the era. He refined the Golgi staining method, enabling more precise study of nerve cell structure, and in 1897 formulated a theory of the orderly arrangement of nerve fibre tracts in the spinal cord (*Gesetz der axialen Zylinderordnung*). He went on to describe several clinical signs, including the subpatellar groove sign (1913) and the erection sign (1923), both still used in neurological diagnosis [Łyskanowski 1976, 497].

[9] See https://www.biography.com/scientists/marie-curie [accessed: 25.10.2025].
[10] See https://www.nobelprize.org/prizes/physics/1903/marie-curie/biographical/ [accessed: 27.10.2025].
[11] Ibid.
[12] See https://www.britannica.com/biography/Marie-Curie [accessed: 29.10.2025].
[13] See https://www.biography.com/scientists/marie-curie [accessed: 25.10.2025].

26. WACŁAW ORŁOWSKI (1868-1949)

A bacteriologist and rabies researcher generally regarded as the first to observe what became known as Negri bodies. Working in Odon Bujwid's laboratory, he noted hyaline-body changes in the anterior horns of the spinal cord, now recognised as pathognomonic for rabies in 1892, eleven years before the Italian researcher Adelchi Negri described the same structures in 1903 and received credit for the discovery [Orłowski 1892; Łyskanowski 1976, 502].

27. LEON MARCHLEWSKI (1869-1949)

A leading chemist and biochemist whose interests spanned inorganic, analytical and organic chemistry as well as biochemistry, much of it tied to industrial chemistry's practical needs. Marchlewski conducted pioneering studies on the structural similarities between the porphyrin frameworks of chlorophyll and haemoglobin [Łyskanowski 1976, 502], studied sugars and anthraquinone/naphthoquinone dyes, developed methods for measuring carbon, sulphur and nitrogen oxides, and iodine in chemical compounds, and was an early adopter of UV spectral analysis. He authored over two hundred scientific papers and several major textbooks, and is widely regarded as the father of the Polish biochemical school [Szczepaniec-Cięciak and Łopata 2008, 65-72].

28. JAN MAZURKIEWICZ (1871-1947)

A leading Polish psychiatrist, Mazurkiewicz led the psychiatric clinic at the Tworki Hospital for 28 uninterrupted years from 1919, including through the German occupation. He proposed the first chrono-topogenic theory of psychic localisation, arguing that mental functions were energetic-mnemonic in nature, and devoted numerous works to the anatomical basis of mental life. Among his many students was Franciszek Wichert, who described the parkinsonian variant of progressive paralysis now known as Wichert's form [Łyskanowski 1976, 501-502].

29. JÓZEF BRUDZIŃSKI (1875-1917)

Discoverer, in 1908, of a characteristic sign of meningitis – what he called the "contralateral reflex of the lower limbs." A year later he identified the more diagnostically valuable neck sign now known internationally as Brudzinski's sign, alongside the cheek, symphyseal, and shoulder signs he went on to describe. His name entered international medical terminology in several

languages, securing his place among the most significant neurologists of his era [Łyskanowski 1976, 494].

30. ANTONI CIESZYŃSKI (1882-1941)

Known as the father of Polish dentistry and recognized as one of its worldwide pioneers, Antoni Cieszyński was born in 1882 in Oleśnica. He was a physician, dentist, radiologist, and one of the most distinguished representatives of Polish dentistry in the first half of the twentieth century. His scientific work focused on the development of radiological diagnostics in dentistry. In 1912, he received the degree of Doctor of Medicine with the highest honors. Among his most significant achievements were the formulation of the isometry principle used in dental radiology (known as Cieszynski isometry), the advancement of intraoral and extraoral radiographic techniques, and the development of conduction anesthesia involving the branches of the trigeminal nerve [Maciejewska and Chomik 2012, 18-22].

Cieszyński was the founder and organizer of the first Dental Institute in Poland, established in Lwów (now Lviv, Ukraine), which laid the foundations for modern academic dental education in the country. His scientific output comprised approximately 375 publications written in seven languages, including the world's first atlas of dental radiology. In 1923, he founded and became the editor of *Dentystyka Polska* (Polish Dentistry), one of the most important Polish dental journals of the interwar period [Sosnowska 1999]. In recognition of his contribution to the advancement of world dentistry, he was awarded the Willoughby D. Miller Gold Medal by the Fédération Dentaire Internationale (FDI). Antoni Cieszyński was executed by the Germans during the massacre of Lwów professors in July 1941.

31. RUDOLF WEIGL (1883-1957)

Born in Przerów (then Austria-Hungary, today the Czech Republic), Weigl chose Polish identity as an adult.[14] He studied at the University of Lwów, completing his habilitation in 1913 [Kozielecki 2005]. During and after the First World War he turned to typhus, a disease devastating East-Central Europe and the war fronts. His method was simple in design and brutal in its demands: breeding lice, growing Rickettsia prowazekii inside them, then extracting material for a vaccine [Kryński, Becla, and Machel Marian. 1974, 19-51].

By the interwar period and through the Second World War, his Lwów laboratory had produced one of the first effective typhus vaccines, saving

[14] See https://chge.uni.edu/rudolf-weigl [accessed: 24.10.2025].

hundreds of thousands of lives [Kozielecki 2005]. Under enormous German pressure, Weigl never renounced his nationality or his humanity. Pressed by the occupiers, he said: "You choose your homeland once. I made my choice in 1918." Life under occupation, he admitted, became nearly unbearable – yet he held to his values [Urbanek 2018, 135-139]. His laboratory became a refuge for the "lice feeders" employed in vaccine production, sheltering intellectuals, students, artists, underground activists and residents of the Lwów Jewish ghetto from deportation and death. An estimated 5,000 people survived the war thanks to him [Urbanek 2018, 321-26].

32. LUDWIK HIRSZFELD (1884-1954)

Born in Warsaw to a Jewish family, Hirszfeld studied medicine in Würzburg and Berlin, defending his doctorate on blood agglutination in 1907. In Heidelberg, working with Emil von Dungern, he co-developed the AB0 blood-group system and demonstrated that blood groups are inherited [Czerwiński, Kaczmarek, and Glensk 2021, 467-69].

During the First World War, as a physician with the Serbian army and later at Warsaw's Institute of Hygiene, he tackled typhus and typhoid epidemics, organising laboratories and medical education under wartime conditions.[15] Between the wars, leading the Institute of Hygiene in Warsaw, he founded the Polish school of immunology and serology and pioneered early practical research into maternal-foetal serological conflict and blood transfusion [Czerwiński, Kaczmarek, and Glensk 2021, 472-74].

During the Second World War, confined to the Warsaw ghetto, Hirszfeld ran secret medical courses and anti-epidemic measures under dramatic conditions [Kowalińska 2020]. After the war he helped organise the Faculty of Medicine in Wrocław; the Institute of Immunology and Experimental Therapy of the Polish Academy of Sciences now bears his name. His legacy comes down to a few core threads: blood-group science that made safe transfusion possible, the spread of population serology, research infrastructure built under extreme hardship, and a fusion of basic research with clinical and social practice.

33. KAZIMIERZ FUNK (1884-1967)

Born in Warsaw, Funk earned a chemistry doctorate in Bern in 1904, then worked at the Pasteur Institute in Paris and the Lister Institute in London.[16]

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[15] See https://1943.pl/en/artykul/ludwik-hirszfeld/ [accessed: 24.10.2025].

[16] See https://doi.org/10.1001/jama.1967.03130070071026 [accessed: 24.10.2025].

In a 1912 Journal of State Medicine paper he coined the term *vitamine* arguing that certain chemical compounds essential to life – whose absence caused deficiency diseases such as beriberi, pellagra and rickets – were a distinct, identifiable class [Spedding 2013, 104-106]. His work showed how profoundly such deficiencies affected population health, opening a new era in nutrition and prevention [Kucharz, Shampo, and Kyle 1994, 656].

Funk's research helped build dietetics and preventive medicine, reducing deficiency disease and improving the health of millions worldwide. He was among the first scientists to demonstrate that medicine need not be limited to treating disease, it could begin with prevention, a principle now built into the foundations of public health.

34. TADEUSZ REICHSTEIN (1897-1996)

Born in Włocławek to a Jewish family, Reichstein emigrated with his family to Switzerland in 1905, eventually earning a chemistry doctorate at ETH Zurich in 1921 under Hermann Staudinger.

Between 1934 and 1944 he studied adrenal cortex hormones, isolating and chemically characterising 29 substances, including corticosterone, hydrocortisone and aldosterone, work that underpinned hormone therapy, especially for rheumatoid arthritis [Grzybowski and Pietrzak 2012, 243-47]. In 1933, working independently of Norman Haworth, he also developed a method for synthesising vitamin C from D-glucose – the "Reichstein process," still used industrially today [Goedecke 2022].

In 1950 he was awarded the Nobel Prize in Physiology or Medicine, jointly with Edward Kendall and Philip Hench, for his work on adrenal cortex hormones – making him the first Poland-born laureate of that particular Nobel category.[17] After retiring in 1967 he turned to fern phytochemistry and cytology, publishing over 80 papers on the subject before his death in Basel in 1996 [de Herder 2014, 98].

35. HILARY KOPROWSKI (1916-2013)

Born in Warsaw to a Jewish family, Koprowski graduated in medicine from the University of Warsaw in 1939 and also trained as a pianist and composer [Croce 2013, 8757]. The war forced him out of Poland, on a path that led through Italy, Brazil, and finally the United States.[18]

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[17] See https://www.britannica.com/biography/Tadeus-Reichstein [accessed: 24.10.2025].

[18] See https://www.whatisbiotechnology.org/index.php/people/summary/koprowsk [accessed: 25.10.2025].

He became a virologist and vaccine developer whose work on an oral polio vaccine is a genuine milestone in medical history. He began research in 1948, and by 1950 the vaccine was being trialled on children in Poland and elsewhere,[19] international in scope before the broader polio epidemic had even been brought under control.

Koprowski's work extended well beyond polio. From 1957 to 1991 he directed the Wistar Institute in Philadelphia, and from 1950 he advised the World Health Organization, eventually authoring more than 875 scientific papers.[20] His career thus bridged research, institutional leadership, and international health policy – with his Polish background remaining a consistent part of how his story has been told. He is best understood as a bridge figure: between Poland and American science, between clinical and epidemiological practice, between virology and vaccine development. His oral vaccines helped sharply reduce polio cases, a disease that had caused widespread permanent disability among children well into the twentieth century [Racaniello 2013].

36. ALBERT B. SABIN (1906-1993)

Born in Białystok, Sabin emigrated with his family to the United States in 1921, where he studied medicine and turned to virus research.[21] His central achievement was the oral polio vaccine (OPV), a landmark in medical history with far-reaching effects on global public health. His strategy of mass administration to block viral transmission across whole populations proved decisive in the fight against the disease.[22]

Though most of his career unfolded in the United States, Sabin grew up in Poland, placing his work within the wider story of Polish contributions to world medicine. His vaccine was applied globally, confirmation of its lasting impact on public health. Notably, when asked who owned the patent on his vaccine, he refused to claim it: *The people, I would say. There is no patent*[23] – a clear statement that his motives were humanitarian, not commercial.

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[19] See https://www.jwp-poland.com/hilary-koprowski-marzenie-o-ratowaniu-ludzkiego-zdrowia-i-zycia/ [accessed: 24.10.2025].

[20] See https://portalpolonii.pl/historia/artykuly_historia.php?id=722 [accessed: 25.10.2025].

[21] See https://www.sabin.org/about/our-history/dr-albert-b-sabin/ [accessed: 24.10.2025].

[22] See https://sites.libraries.uc.edu/sabin [accessed: 26.10.2025].

[23] See https://www.who.int/news-room/spotlight/history-of-vaccination/history-of-polio-vaccination [accessed: 24.10.2025].

37. TADEUSZ KRWAWICZ (1910-1988)

Born in Lwów, where he completed his medical studies in 1938, Krwawicz had originally enrolled at the Kraków AGH University of Science and Technology before the humanities pulled him elsewhere. He initially aimed to become a surgeon but instead took up an assistantship in ophthalmology under Professor Adam Bednarski. The Second World War interrupted his growing passion for the field. Krwawicz researched corneal and lens-graft preservation and a method for extracting the lens without damage, and turned, for inspiration, to Wróblewski and Olszewski's cryogenic work, applying its principles to cataract treatment. His method involved freezing and extracting the clouded lens using a specially cooled applicator (cryo-extraction) which for the following two decades was regarded as the safest and most effective cataract treatment, widely adopted in ophthalmic practice around the world [Skłodowska and Szaflik 2007, 11-14].

CONCLUSIONS

Let's return to the line every physician should remember: *Whoever saves one life saves the entire world*. The figures gathered here (and the list could, and should, be far longer) did not save one life each, but countless worlds. Oczko restored health in royal courts, Śniadecki brought modern biochemistry into being, Beiser built the first structures of hospital science, Łukasiewicz lit the nights of the operating table with a kerosene lamp, Wróblewski and Olszewski opened up the realm of low temperatures and new states of matter, Skłodowska-Curie shaped the era of radiology, Weigl saved cities from typhus, Hirszfeld unravelled antigens and blood-group inheritance, Koprowski and Sabin saved millions of children from polio, Reichstein systematised and humanised hormone therapy. And yet many of them had to contend with the erasure or relocation of their own identity – as though greatness that belongs to the world could not also belong to Poland, as though it had to forget its roots to be recognised.

Norwid wrote of Chopin: *Polish at heart, a citizen of the world by talent*, a truth bigger than music. The same could be said of all of them: Oczko was a Pole and a Renaissance European, Skłodowska-Curie was a Pole and the creator of modern physics and medicine, Koprowski, Sabin, Reichstein were Poles and physicians shaping the innovation of the world. Their Polishness was never a limitation. It was a source of memory, imagination, courage and at times, the pain of displacement, which they turned into a sense of mission.

Poland's contribution to world medicine is not just an episode. It is a structure, a tradition, a continuity of conviction that human life is an absolute

value. Which brings us back to the fullest sense of whoever saves one life saves the entire world.

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