A Note from History:
Scarcely Remembered Inventors of New Terms in Clinical and Laboratory Science

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It is true, as often said, that history is an unfolding of unique events. This is perhaps more true in the sciences than in any other field. Furthermore, in medicine, it seems that discoveries follow each other in an aberrant and unpredictable fashion. With attention to the subject matter—inventors of terms in laboratory medicine—reviewed in this article, readers may be surprised that 7 of the 17 scientists who invented permanently irreplaceable medical laboratory terms were non-physicians, and that among those who were physicians, only 2 were pathologists.

**Bernard Naunyn** (1839–1925) was Professor of Clinical Medicine successively at Berne and Strasburg. He focused most of his interest on diseases of the liver and pancreas. While studying the metabolic disturbances in diabetes, he introduced the term *acidosis* in 1898 [1]. Four years later, he published the first classification of gallstones based on chemical methods.

**Carl O. Harz** (1842–1906), a German botanist, identified certain pathogenic microorganisms in 1879 and coined the term *actinomycosis* [2]. The following year, Emil Ponfick, a German physician, recognized the identity of the animal and human forms of the disease [3], which led to the isolation of the organisms, *Actinomyces*, 11 years later [4].

**Franz J. Fischler** (1876–?), a physician and ardent student of chemistry in Heidelberg, Germany, coined the word *alkalosis* in 1911 [5]. He should also be recognized for introducing the fatty acid stain in 1904 [6].

**Hippocrates** (460–375 B.C.) was the first who mentioned the word *anemia*, but he did not describe what it was [7]. Apparently, anemia remained an undefined ailment until 1824, in England, when **James S. Combe** (1796–1883) described in detail a case of anemia [8]. On review of the clinical findings, the case was reclassified as *pernicious anemia* or so called *anaematosis* when William Pepper’s article was published in the United States in 1875 [9].

**Alexandre Donné** (1801–1878), a French physician described and illustrated blood platelets in 1842 [10], but it was **Guilio Bizzozero** (1846–1901), an Italian physician, who gave the *blood platelets* their name in 1882 [11]. Although 13 years earlier, in 1868, Bizzozero demonstrated that erythropoiesis and leukopoiesis take place in the bone marrow, the origin of blood platelets remained unknown until 1906, when **James H. Wright** (1871–1928), a young American pathologist, demonstrated that platelets are derived from megakaryocytes [12]. It is of interest that 4 years earlier, in 1902, at the age of 31, Wright devised and published a stain for differential staining of blood cells [13], the Wright stain, which brought him world renown.
**Johann Mikulicz-Radecki** (1850–1905), a Romanian surgeon in Germany, is best known for his description of chronic hypertrophic enlargement of the lachrymal and salivary glands [14], known eponymously as Mikulicz’s disease. It is less well-known that 16 years earlier, in 1876, about the time he graduated from medical school, he described large round cells with small dark nuclei and vacuolated cytoplasm. Mikulicz named the unusual cells **foam cells** [15].

**Ernest Hoppe-Seyler** (1825–1895), a German physiological chemist, introduced in 1864 the name **hemoglobin** for the red coloring matter he isolated in crystalline form from the blood [16]. The red colored substance in the blood had been discovered by Otto Funke (1828–1879), a German physician, 13 years earlier, in 1851, but he failed to name it [17].

**Thomas P. Sprunt** (1884–?) and **Frank A. Evans** (1889–?), American physicians, introduced the term **infectious mononucleosis** in 1920 [18]. Until that time the disease was known either as Filatov’s disease or idiopathic adenosis after its first report by a Russian pediatrician in 1885 [19]. A few years later, in 1889, due to the influence of a German physician, it also became known as Pfeiffer’s disease or glandular fever [20]. Despite the availability since 1932 of a serologic test, the Paul-Bunnell reaction, for identification of heterophile antibodies [21], the causative agent—the Epstein-Barr virus—was not identified until 1968 [22].

**Gerardus J. Mulder** (1802–1880), a Dutch chemist who analyzed human and animal tissues, obtained in 1838 a substance he believed to be the basic constituent of all organic bodies and hence he named it **protein** [23].

**Clarence E. McClung** (1870–1946), an American zoologist, identified and named the sex **chromosomes** in 1902 [24]. Although it was Edmund B. Wilson (1856–1939), an American physiologist, who showed in 1896 that chromosomes play a role in heredity [25], the concept of sex-linked heredity [26] was elucidated in 1913 by Thomas H. Morgan (1866–1945), an American biologist, for which he was awarded the Nobel prize in 1933.

**Verne R. Mason** (1889–?) a physician on the staff of Johns Hopkins Hospital in Baltimore, gave **sickle cell anemia** its name in 1922 [27]. However, the peculiar elliptical red blood cells found in association with anemia had been first described in 1904 [28] by Melvin Dresbach (1874–1946), an American physician.

**George W. McCoy** (1876–1952) and **Charles W. Chapin** (1877–?), bacteriologists in California, isolated and named the organism **Bacterium tularensis** in 1912 [29]. They coined the name in allusion to Tulare County in central California, where the affected squirrels were originally captured. Another Californian bacteriologist, **Edward Francis** (1872–1957) named the new infectious disease **tularemia** in 1914. The name caught on in infectious disease circles and rapidly replaced the old name “deerfly fever,” although Francis did not publish his definitive paper, Tularemia, in the JAMA until 1925 [30].

**References**

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