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One Hundred Years Ago

By Merlin Larson, M.D.

1903? ... Anybody care? A few hours at the Guedel Library allowed me to ferret out information about what was happening in the world, medically and otherwise, one hundred years ago. Mistrust and hatred between different religious and ethnic groups in 1903 was much the same as it is today. In 1903, there were hundreds of government sanctioned ethnic hate-related murders in Kishinev, Russia, and Muslims and Christians were killing each other in the Balkans. On September 8th, Turkish troops massacred 40,000 Bulgarians in Macedonia. Theodore Herzl, the founder of the Zionist movement announced on August 19th that the Jewish people would not accept a homeland in Uganda as proposed, but would build a Jewish state in Palestine, the land given to them by God. A new immigration law in the United States excluded admission of "idiots, convicted felons, polygamists, anarchists, the insane, epileptics, and women of bad repute" (March 3, *New York Times*). The Boer War in South Africa had ended in 1902, but the world was on the brink of war again, with Japan and Russia at loggerheads over the domination of Manchuria and Korea.

The seeds of American industrial might were planted in 1903 by the opening of the new Ford Motor Company in Detroit, Michigan, and the renovation of the New York Stock Exchange in Manhattan. The Wright brothers on December 17th demonstrated air flight by a heavier-than-air machine in Kitty Hawk, North Carolina. The new upstart American League baseball champions, the Bostons, beat the favored Pittsburgh Nationals in the First World Series, with Boston's star pitcher, Cy Young, winning two of three games.

Were there any articles published in 1903 that presented new information relevant to the current practice of anesthesiology? The following selections show that 1903 was not a barren year for discoveries.

In 1903 Willem Einthoven described the first electrocardiograph machine. It weighed 600 pounds and was probably ignored by those providing anesthetics at the time. ("The string galvanometer and the human electrocadiogram." *K Akad Wet Amst Proc Sect Sci* 6:107-115, 1903.) Einthoven entered into a business partnership with Horace Darwin, the son of Charles Darwin, and by 1928, a 30-pound machine was on the market. Herrick recognized the value of the EKG in the diagnosis of myocardial infarction in 1912, and Einthoven was awarded the Nobel Prize for his work in 1924. It was well past mid- century before the EKG entered the operating room, but it is now used during almost every anesthetic.

Emil Fischer and Joseph von Mering described the first sedative barbiturate, diethyl barbituric acid (Veronal), in 1903. ("Ueber eine neue Klasse von Schlafmitteln." *Therap Gegenw* 44:97-101, 1903.) Adolf von Baeyer had synthesized barbituric acid in 1864 but this drug had no sedative properties. Baeyer discovered the compound on Saint Barbara's Day, and the word barbiturate is a combination of Barbara with urea, because urea was used in the synthesis of the new molecule. Since 1903 there have been over 2,500 barbiturates synthesized, over 50 of which have been marketed as sedatives. The development of soluble barbiturates suitable for intravenous use took 20 years to accomplish. Helmut Weese described the use of hexobarbital as an induction agent on several thousand patients in 1932. Thiopental, popularized by John Lundy while working at the Mayo Clinic in 1934, is still in use today.

Heinrich Braun described the benefits of adding epinephrine to cocaine in performing nerve blocks in 1903. In 1897 Abel had identified epinephrine as the pressor agent found in adrenal glands, and the purified drug was available before the turn of the century. Braun administered epinephrine to himself and found that

he could tolerate up to 1 mg after subcutaneous administration (Ueber den Einfluss der Vitalitat der Gewebe und ueber die Bedeutung des Adrenalins fur die Localanasthesie. *Arch Klin Chir* 69:541, 1903). His landmark article describes how adding epinephrine to the cocaine solution enhanced the intensity and duration of local blocks. Epinephrine is the only drug that we use that requires the old fashioned nomenclature to denote concentration, and that somewhat confusing terminology can be traced to this article. Although it may make sense to us, it remains awkward terminology: 1:1 means one gram for 1 cc of solvent, making a 1:100,000 solution contain one gram in 100,000 cc's or 10 micrograms/cc. Braun's first textbook on regional anesthesia was published in 1905 and is considered by many to be the first book on regional anesthesia. Percutaneous blocks of the brachial plexus were not described until 1911. The English translation of the third edition of Braun's textbook, dated 1914, is in the Guedel Library.

In 1903 Richard von Steinbüchel described the use of morphine and scopolamine injections as analgesia for labor and delivery ("Die Scopolamin- Morium-Halbarkose in der Geburtshulfe." *Beitr Z Geburtsh a Gynak* 60:294-326, 1903). The method became known as *Dämmerschlaf* in Germany and *Twilight Sleep* in America. Several American women visited the German clinics in the first decades of the century and returned to America determined to promote the use of *Twilight Sleep* to potential mothers. One of the first to visit Germany was Mrs. Francis Carmody who wrote in the *Ladies Home Journal*: "I now make my last appeal to every woman who has read this to take up the battle for painless childbirth where I left off. Fight not only for yourself, but for your sister, your sex, the cradle of the human race." For the next half century, *Twilight Sleep* was vigorously promoted by women's groups and it became a legitimate method of pain relief for labor.

From all indications *Twilight Sleep* was a nightmare for the physicians and nurses involved in providing analgesia for labor.* The method often resulted in a delirious mother and an asphyxiated newborn. Essentially the scopolamine took away the memory of labor pain, without alleviating it, and the morphine,

* Husbands were spared the scene of wailing and flailing amnestic parturients in the throes of labor pain by being perched in a separate "father's waiting room" far removed from the cacophony of their laboring spouse. This represented the antithesis of today's family-centered childbirth. And the mothers often were unaware of their birth until hours post-delivery. Of course, the fathers were free to "light up" their expensive cigars when advised by the obstetrician of the same arrival of their child.

while not necessarily asphyxiating the laboring parturient, often resulted in the birth of a severely respiratory-depressed infant. Edwards and Hingson introduced continuous caudal anesthesia with the use of a malleable needle in 1942 and over the following two decades it became apparent that regional anesthesia for labor and delivery was safer and more effective than the older techniques. The von Steinbüchel 1903 article had a profound influence on labor and delivery for decades, but is best ignored today.

Harvey W. Cushing, the famed neurosurgeon and Surgeon-in-Chief at Harvard's Peter Bent Brigham Hospital, developed an early interest in anesthesia. While he was a medical student at Harvard, he was called upon to anesthetize a woman with a strangulated hernia. During the procedure gangrenous necrotic bowel was found and the patient died on the operating table. He vowed then to study methods to improve anesthetic safety.

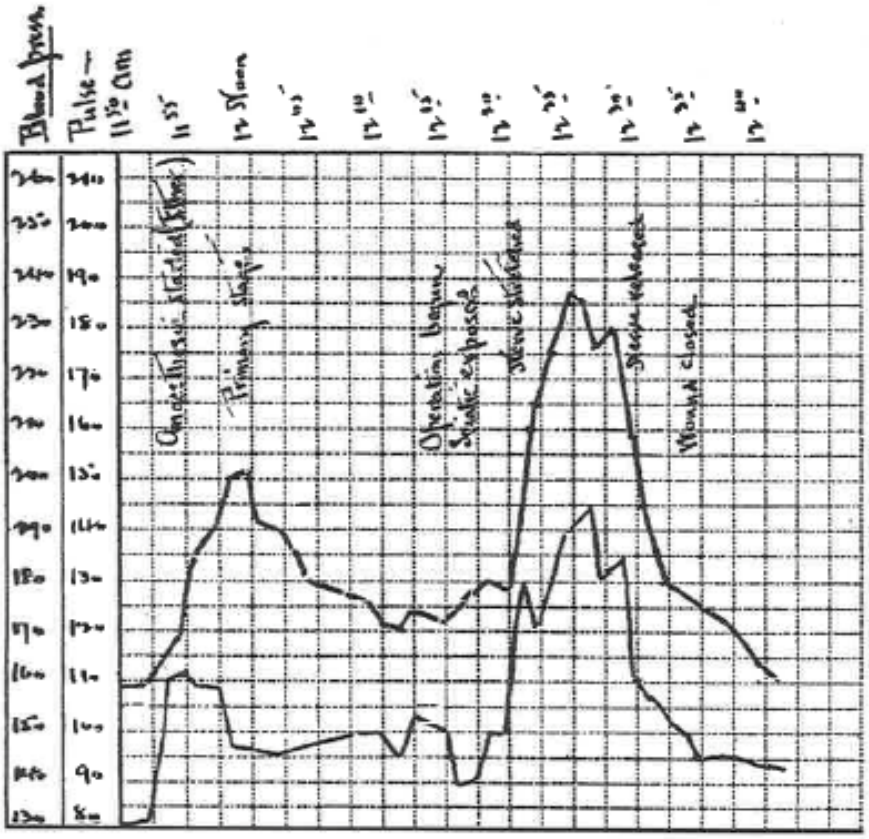
His early neurosurgery training took him to Europe where he studied in Germany, Switzerland and Italy. While in Pavia, Italy, he encountered a simple device invented by Scipione Riva Rocci to measure blood pressure. On returning to Boston, Cushing reproduced the instrument and used it on his surgical cases.

His 1903 paper recommended the routine use of the Rivi-Rocci device on all anesthetized patients. ("On routine determinations of arterial tension in operating room and clinic." *Boston Med Surg J* 148:250- 256, 1903.) His suggestion was summarily rejected by the Harvard surgical faculty. A committee formed to study the question decided that "the skilled finger was of much greater value clinically for determination of the state of the circulation than any pneumatic instrument."

Later in the same year, George Crile, chief surgeon at the Cleveland Clinic, adopted the suggestion that Cushing had made and wrote a short monograph on the subject ("Blood Pressure in Surgery"). With Crile's support, blood pressure measurements were gradually introduced into the newly emerging anesthetic records that were being developed at the same time.

It is unlikely that the readers in 1903 could have recognized the lasting impact that these publications were to have on the practice of anesthesiology in the following century. Likewise, today it is often difficult to assess the importance of current publications. Some seem highly relevant to the issues of the day but seem outdated the following year. Others, like the Fischer and von Mering article, will lie dormant for several years before their importance is recognized. Most, how-

ever, like this one, will be briefly scanned by a few readers, never totally read, and with the next issue, forgotten forever.



An early anesthesia record of Harvey Cushing showing systolic blood pressure (top) and pulse rate (bottom tracing). The first rise in blood pressure occurred during the excitement phase of ether induction and the second rise was during release of adhesions of the sciatic nerve. Vertical lines are 2.5 min apart. Note that the systolic blood pressure rose to above 230 mm Hg during the operation.