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# Surgical History *William Arbuthnot Lane (1856–1943): Surgical Innovator and His Theory of Autointoxication*

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**William Arbuthnot Lane contributed to the advancement of many fields of orthopedics, otolaryngology, and general surgery. He is credited for his “no-touch technique” and the invention of long-handled instruments, some of which are still in use today, to minimize tissue handling. He is most well known for his hypothesis that slowing of gastric contents could cause a variety of ailments and this became known as Lane’s disease. Although his surgical treatment of Lane’s disease is now defunct, it advanced the surgical technique in colorectal surgery. It seems likely that some of Lane’s “autointoxication” patients would be classified today as patients with colonic inertia, diverticulitis, colonic volvulus, and megacolon or, which are all treated with colectomy. Lane was a pioneer in multiple fields and a true general surgeon. He advanced colorectal surgery immensely and propelled the field of surgery into a new era.**

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**W**ILLIAM ARBUTHNOT LANE was born on July 4, 1856 in Inverness, Scotland (Fig. 1). He was destined to follow in his father’s footsteps as a distinguished military surgeon. Over the course of his lifetime, Lane made major contributions to the field of general and colorectal surgery and the surgical techniques he developed are still in use today.

For most of his early life, William Lane was groomed for surgery as he traveled alongside his father to military medical stations throughout Europe. At just 16 years of age, Lane’s medical education officially commenced at Guy’s Hospital (London, England). After earning a Master of Surgery degree at the University of London, Lane worked as a skeletal anatomist, researching skeletal function and the impact of occupation on bone structure.<sup>1</sup> He was an accomplished author on the topic of middle ear disease and was one of the first to surgically explore the mastoid antrum.<sup>2</sup> In 1905, Lane published a book on cleft palate management advocating early repair allowing the child relatively normal growth and increased function.<sup>2</sup> He is also credited for a landmark operation in which he resected an esophageal carcinoma, which purportedly served as an inspiration for William Trotter’s surgical resection of pharyngeal carcinomas.<sup>2</sup> Lane developed several operative instruments, some of which are

still in use today. His “no-touch technique” involving the creation of long handled instruments to keep gloved hands off of tissue, is considered by some as his greatest contribution to the field of surgery.

The latter years of Lane’s career focused largely on the concept of “intestinal autointoxication.” Lane hypothesized that the colon was used solely to store waste and regulate elimination during fight-or-flight situations.<sup>1</sup> He believed the evolution of quadruped primates into biped *Homo sapiens* complicated this mechanism. The stress of the upright human on the transverse colon combined with the simple force of gravity slowed transit. These stresses resulted in the formation of bands, most notably Lane’s band at the terminal ileum. Lane hypothesized that these bands caused intestinal stasis with local changes in bowel flora resulting in systemic sequelae including gastric cancer, atheromatous plaque formation, duodenal ulcers, pancreatitis, cancer, and gallstones. Lane believed that the absorption of these intestinal toxins had degenerative effects on many major organ systems and could cause mental disorders, going as far as stating that tuberculosis and rheumatoid arthritis could only exist in a person who was afflicted with autointoxication.<sup>1</sup>

After Lane proposed his theory of intestinal stasis, a test of this hypothesis was necessary—the colectomy. In this series of surgical experiments, Lane removed sections of the colon with seeming resolution of symptoms. In 1908, Lane published an article in the *British Medical Journal* titled, “Remarks on the

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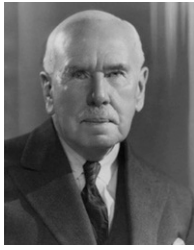


FIG. 1. Alexander Bassano. (Photographer). Sir (William) Arbuthnot Lane, 1st Baronet 1938. National Portrait Gallery. Web. July 1, 2015.

Operative Treatment of Chronic Constipation.”<sup>3</sup> This article described cases in which total or partial colectomy was used to treat patients with “intestinal auto-intoxication.” Originally, the procedure was only used for pain, but after recognizing the “immense advantages” which his patients received, he began performing colectomies in patients where “pain was not necessarily such a marked feature, but where life was becoming a burden through the misery and distress induced by auto-intoxication and its results.”<sup>4</sup> He remarked on the abrupt change in his patients after surgery. Thirty-nine cases were contained in the series, and he described great improvement, noting many patients’ claimed that they “felt the best they have in years.”<sup>3</sup>

Total colectomy, ileosigmoidostomy, and other variations of colon resection quickly spread in popularity throughout Europe and the United States. The overall mortality of the procedures during this time is not known with certainty, however, Lane is said to have had a lower mortality rate when compared with the 16.5 per cent that was reported as the overall mortality rate of Guy’s Hospital.<sup>5</sup> American surgeons were intrigued by the operation for intestinal stasis, or “Lane’s disease” as some called it, and invited Lane to speak at the International Congress in New York in 1911. Lane recalls that his talk received “perhaps the greatest ovation he ever had.”<sup>1</sup>

Although his ideas held perhaps some scientific basis and had various supporters, others criticized the theory as “total nonsense.”<sup>1</sup> One of Lane’s biggest critics, Arthur F. Hurst, remarked that the offending organisms and their toxins may produce disease, but the liver must filter these organisms, thus concluding that “auto-intoxication” is more of a hepatic illness.<sup>1</sup> Dr. Hurst remarked that he only wavered in his opposition to Lane and his ideas when asked to see two specific patients with miraculous resolution of systemic illnesses after surgery. However, after one patient’s symptoms returned, Hurst ultimately opposed Lane’s ideas entirely.<sup>1, 6</sup> Another contemporary, Anthony

Bassler, published an article condemning Lane.<sup>7</sup> He believed that colectomy was only warranted for obstruction and that the relief experienced by Lane’s patients was a placebo effect. He also highlighted the high percentage of patients who had a recurrence of symptoms years later.<sup>7</sup> Further observations failed to validate auto-intoxication.

By 1915, the theory of intestinal stasis and auto-intoxication had waned. Ten years later, the routine surgical treatment of intestinal stasis was a thing of the past. Guy’s Hospital was only performing about one case per year, and it was no longer performed at the Mayo Clinic nor at other hospitals in the United States. Although Lane’s theory of intestinal stasis and its surgical repair were no longer accepted, its lasting legacy is the perfection of his techniques for safe colorectal surgery, particularly the ileocolic and ileorectal anastomoses.<sup>8</sup>

At the end of his career, Lane was satisfied with the success of his operative treatment for Lane’s disease despite frequent failures. He believed these successes proved his theory, and that the disease could be prevented by certain habits. He became interested in the impact that roughage had on intestinal stasis. He founded the New Health Society, toured Europe, and gave lectures about the benefits of fruits, vegetables, sunshine, and exercise. The medical community, especially the British Medical Association, resisted his ideas. However, this did not deter Dr. Lane and his firm belief in auto-intoxication led to his eventual resignation from the British Medical Association in 1924.<sup>1</sup> Lane’s tireless efforts ultimately served to advance the field of colorectal surgery immeasurably, and indeed his improvisation and curiosity propelled all of surgery into a new era.<sup>1</sup>

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