CHAPTER 1

Some Aspects of the History of Local Anesthesia

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A. Introduction

As befits its importance to the relief of suffering in man, the writings on the history of local anesthesia are extensive, as those also were in relation to its predecessor, inhalation anesthesia. Strangely, those accounts appear largely in the American literature although the first clinical application of the anesthetic properties of cocaine took place in Vienna, in 1884. Full credit, as we shall see, is now given to Koller, the perpetrator. Although his contribution was not beset with the kind of controversy that surrounded the advent of inhalation anesthesia, it might have been that local politics, Koller's aggressiveness and his religious adherence caused the event to be underemphasized abroad. Although regional anesthesia (a term reputedly coined by the American surgeon Harvey Cushing) was immediately applied clinically in America, the scientific basis and its multifold techniques were established in Germany around the turn of the century. In England, where there already existed a considerable degree of anesthetic professionalism, inhalation anesthesia continued to dominate despite decades of debate over the merits of chloroform, its mode of administration as well as adverse pharmacologic effects and toxicity. In that country to this day, regional anesthesia constitutes only a small share of practice while in America resurgence of interest in the method has occurred. Moreover, intravenous agents for induction and maintenance of general anesthesia now preoccupy practitioners both in England and on the continent. Those developments, of a certainty, relate to the intellectual environment of the times in the respective countries.

The most extensive accounts of the birth of local anesthesia reside in Hortense Koller Becker's account Carl Koller and Cocaine (BECKER 1963) and in Robert Byck's edited collection of Cocaine Papers - Sigmund Freud (BYCK 1974). Extensive coverage of the subject is to be found in T. E. Keys' The History of Surgical Anesthesia (KEYS 1945); in Faulconer and Keys' Foundations of Anesthesiology (FAULCONER and KEYS 1965); and in Fink's recent "History," an introductory chapter to a textbook on regional anesthesia (FINK 1980). A complete review of the early known pharmacology of local anesthetics was prepared by HIRSCHFELDER and BIETER (1932). In the narrative given here some of the details of the "discovery" will be treated initially because of their dramatic nature, followed by an historical background for many of the topics covered in this monograph.
According to MORTIMER (MORTIMER et al. 1974; GAY 1976) the coca leaf was believed to be a gift to the Incan people from Manco Capac, son of the Sun God, bestowed as a token of esteem and sympathy for their suffering labors. The leaves were initially to achieve a rather narrow usage among the religious and political aristocracies of Incan society: a much broader and perhaps more sinister pattern was noted following the destruction of the Incan civilization in the sixteenth century, by Francisco Pizarro and the invading conquistadores, as the lower classes and slaves were “paid off” in coca leaves as an effective method of increasing and prolonging their low-cost, high-output labor. In practice, coca leaves bound into a ball (cocada) with guano or cornstarch were chewed with lime or alkaline ash to release the active alkaloid.

“Thus coca served as a stimulating tonic to those working in the thin air of the Andes. Further anthropologic documentation indicated that the highly sophisticated surgical procedure of trephination was repeatedly successful in this era, as the operating surgeon allowed coca-drenched saliva to drip from his mouth onto the surgical wound, thus providing adequate (and very real) local anesthesia, and permitting the operation to proceed in relative quiet.”

“Little was heard of coca as a medical entity until 1859, when the Italian physician Paolo Mantegazza declared coca leaves to be a new and exciting weapon against disease.”

Then American physicians, following Mantegazza’s lead, proclaimed the drug to be a panacea for almost every malady. Dr. Scherzer, an Austrian explorer and member of an expedition to South America, had brought coca leaves to Vienna. Samples were sent to Friedrich Wohler for examination, in turn given to his laboratory pupil, Albert Niemann, who then isolated the alkaloid (NIEMANN 1860). Niemann’s “cocaine” crystalized in large, colorless four-to-six sided prisms, with a somewhat bitter taste and producing an anesthetic effect on mucous membranes. The crystals, which melted at 98 °C, were difficult to dissolve in water but easily soluble in alcohol and they formed salts. On heating in hydrochloric acid, benzoic acid, methyl alcohol and a little-known base, ecgonine, were formed (later on, the Merck Company gave ecgonine to Sigmund Freud, for clinical trial). Because the salts of hydrochloric or acetic acid were highly soluble they were deemed suitable for physiologic and therapeutic use.

In 1880, von Anrep published an extensive article on the physiologic and pharmacologic effects of cocaine (VON ANREP 1880). Large doses, in warm-blooded animals, produced powerful psychic agitation and excitation. Respiration and pulse were accelerated, the pupils became dilated, hyperperistalsis developed, blood pressure rose and secretions were diminished (others had already shown that the effects depended largely upon the mode of administration). Insofar as local anesthetic effects were concerned, injection under the skin as well as painting the mucous membranes brought about loss of feeling and pain. Von Anrep treated animals for 30 days with moderate doses of cocaine and detected no detrimental effects on bodily function. He clearly described the locally numbing effects on the tongue, even the dilation of the pupil upon local application, and suggested that this drug might some day become of medical importance.

According to Byck’s edition of collected papers (BYCK 1974), after the introduction of cocaine in the United States, Sigmund Freud became interested in its