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In Reply:—The previous letter by one of us was not concerned with the history of curare in anesthesia, but rather with early observations on the critically important effect of curare on the upper airway.¹ Nonetheless, the letter did make reference to the introduction of curare into anesthetic practice, and Dr. Goerig's communication raises some interesting questions on that point.

It is clear that H. R. Griffith and G. E. Johnson of Montreal, Canada were not the first to administer curare to anesthetized patients. A group of American anesthesiologists are said to have assessed the muscle-relaxing properties of a semi-refined preparation of d-tubocurarine in at least two patients in the 1930s, but to have discontinued its use because of concern about total respiratory paralysis.² As outlined in Dr. Goerig's letter, a German surgical registrar named Laewen gave a preparation of calabash curare called "Curarin" to a number of surgical patients in about 1912.³ His purpose was to see if it would produce abdominal wall relaxation during light anesthesia. Laewen observed this effect but did not continue to use or study Curarin, apparently because of a limitation of reliably potent supplies.

Both of these early experiences with curare in the context of anesthesia are of historic interest. However, as far as can be ascertained, neither led to its use by other anesthetists or surgeons of the time, and hence neither can be considered to have launched curare into anesthetic practice. Its use in anesthesia occurred only after publication of the well-known clinical study of Griffith and Johnson in 1942, which showed that a relatively pure and stable preparation of curare could produce "excellent muscular relaxation" reliably and safely in anesthetized patients.⁴

Although Laewen cannot be credited for having introduced curare into the practice of anesthesia, he is certainly worthy of recognition in the history of anesthesia. He appears to have been the first to have correctly perceived how a neuromuscular blocking agent can be employed to advantage during anesthesia; the first to have studied curare in animal models for this particular purpose (in mice and guinea pigs); and the first to have administered curare and observed its principal beneficial effect in anesthetized humans. Even though the dose of the curare preparation he administered by the subcutaneous or intramuscular route seems to have been quite small,⁵ he found that "the effect during suturing of the abdominal wall was obvious and desirable."³ His 1912 article is fascinating, not only with respect to the suggested

usefulness of curare during anesthesia, but also with respect to another novel idea for that time—the use of regional analgesia after abdominal surgery to improve ventilatory function and thereby prevent postoperative atelectasis and pneumonia! Laewen seems to have been a highly inquisitive and innovative surgical registrar who saw solutions to important anesthetic problems many years before they were thought of again and introduced into practice. He was decades ahead of his time.

We concur completely with a message implicit in Dr. Goerig's letter, *i.e.* that older literature can be most interesting, even instructive—yet easily overlooked. Indeed, that was the theme of the previous communication from one of us concerning curare and the upper airway.¹

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Preparation of Oral Naltrexone Solution

To the Editor:—Since publication of our paper¹ regarding the use of prophylactic naltrexone to prevent pruritus associated with epidural morphine, I have received several phone calls from pharmacists and anesthesiologists inquiring about the method of preparation of naltrexone as an oral solution. Naltrexone is available in 50-mg tablets, and the dose we recommend for prevention of pruritus is 5–6 mg. The 50-mg tablet is crushed and dissolved in 50 ml of water, and we

administer 5–6 ml of the solution (5–6 mg) plus 4 ml of any flavored syrup orally within 5 min of administration of morphine. The solution is stable for 24 h.

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