

1902 to produce amnesia and analgesia during the first stage of labor. The method, known as "twilight sleep," was abandoned because a high incidence of asphyxiated babies resulted from its use. The barbiturates were introduced into obstetrical practice in 1928. Many agents and methods have been introduced to produce painless childbirth. Gwathmey's synergistic analgesia, spinal, paravertebral, peridural and sacral anesthesia all have their advocates. The safest method is direct local infiltration. 12 references.

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Pharmacology as a scientific discipline has developed during the last hundred years although various drugs had been applied to the relief of pain since the beginning of civilization. Semi-pharmacologic studies on such gases as oxygen and nitrous oxide began with the development of modern chemistry. Humphry Davy and Henry Hill Hickman conducted such experiments before the demonstration of nitrous oxide for surgical anesthesia by Horace Wells and of ether by W. T. G. Morton. After these practical demonstrations of anesthesia, pharmacologic studies of anesthetics began. In 1847, Flourens reported crude studies on the anesthetic properties of chloroform in comparison with ether. Pirogoff studied etherization and Simpson made an extensive survey of ether and chloroform. J. F. M. Heyfelder studied ethyl chloride as an anesthetic. John Snow made systematic pharmacologic studies on anesthetic agents. His student, B. W. Richardson, studied the comparative toxicities of various alcohols, ethers, and other hydrocarbon

compounds. Claude Bernard made an analysis of anesthetic agents and proposed the first theory of the mechanism of action of anesthetic agents in incomplete reversible coagulation of protein. In 1806, F. W. A. Sertürner isolated a chemically pure, crystalline compound from opium. This was named morphine. Cocaine has been isolated from coca leaves, and Carl Koller studied this drug and introduced it as a local anesthetic. R. Willstätter determined the chemical constitution of cocaine and this led to the further study and chemical modification of the drug which in turn led to the introduction of other local anesthetic agents. A. Einhorn developed "novocaine" which, under the public name of procaine, is the least toxic and most effective local anesthetic for infiltration anesthesia.

Quantitative methods in studying anesthetic agents were developed slowly but many workers have contributed to these studies. The effect of various general anesthetic agents on metabolism and devices for measuring the content of these agents in the tissues have been developed. Ethylene was rediscovered. Cyclopropane was discovered. The anesthetic properties of divinyl oxide were predicted before the agent was produced. Further studies are being made among the unsaturated and unsymmetrical hydrocarbon ethers. The barbital was vigorously explored under excessive commercial competition. The central depressant action of the alcohols were also studied, with the addition of halogens. Avertin was one of the results of these studies. Many pharmacological studies on the mechanism of anesthesia have resulted in brilliant hypotheses, without much substantial evidence in conclusive support of any particular one. As yet we do not know how anesthetics act nor what pain is.

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