

sterile product and the ordinary stock product. Trypsin solutions (Fairchild's standard preparation), in contrast, lost 95% activity in 3 hours under the same conditions. Papain solutions were unaffected by the presence of serum in sufficient concentrations to inhibit trypsin almost completely at the same activity concentration. In the peritoneal cavity of dogs, papain solutions at concentrations of about 1-15,000 retained 50% activity after 5 hours.\* Under similar conditions, the activity of trypsin disappears completely within 2 hours.<sup>5</sup>

The minimal fatal concentration for normal dogs may be placed at 1-2,000, when using 1 liter of isotonic saline per 10 kg. dog. At concentrations up to 1-300 there is marked irritation of the peritoneal surfaces and some hemorrhage. However, the amount of blood thus liberated, as indicated by hemoglobin determinations, has never exceeded 12 cc. and is thus not sufficient to explain the cause of death. Other possible explanations are being studied. Concentrations of 1-15,000 cause some irritation and occasionally slight bleeding, the amount of blood rarely exceeding 1 or 2 cc. These conclusions are based on experiments with 16 dogs. The extent of irritation caused by papain and by trypsin is about the same mgm. for mgm., as determined in 12 rats at concentrations of 1-2,000 and of 1-10,000. In this higher dilution there is little or no irritation with either. By way of reference it may be pointed out that papain has been considered effective in concentrations of 1-400,000.<sup>1, 2, 4</sup>

## 5600

### Effect of Carbon Dioxide on Ethylene and Nitrous Oxide Anesthesia.

GEORGE B. KLEINDORFER. (Introduced by J. T. Halsey.)

*From the Department of Pharmacology, Tulane University.*

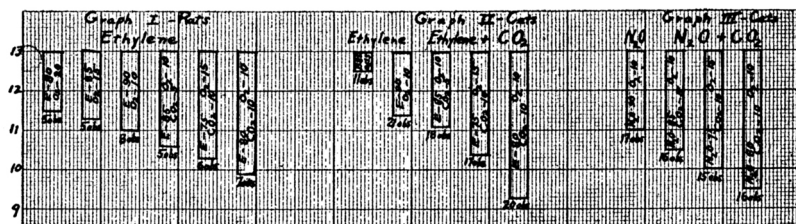
As a continuation of the investigation of the effects of CO<sub>2</sub> in anesthesia, this report embodies the results of a study of the effect of this gas on anesthesia by ethylene and by nitrous oxide. As shown in the accompanying graphs, it has been found that CO<sub>2</sub> exerts an effect on anesthesia by these gases of the same nature

---

\* Determined by activating removed samples with H<sub>2</sub>S and assaying by the photographic film method. Addition of H<sub>2</sub>S increases the activity about 36 times.

as on anesthesia with ether recently reported in this bulletin (Kleindorfer).<sup>1</sup>

Thirty-six observations on the effects of mixtures of ethylene and oxygen with or without CO<sub>2</sub> were made on 10 white rats using the same methods employed in the ether series. The results are indicated in Graph I. However, the depth of the anesthesia procurable in these animals by these gases was so slight that it appeared desirable to supplement this series by observations on other animals. Because of the inconsistency of the reactions of rabbits to electrical stimulation of the divided sciatic nerve, which was the criterion used in this series, these animals were found not to be well suited to this type of investigation. While the results were in line with those in the rat series they are not reported in detail.



Change in strength of effective stimulus before and after administration of different gas mixtures as indicated by the change in distance of secondary from primary coils of inductorium.

The results of 87 similar observations on 12 cats are indicated in Graph II.

Results of 64 observations of the effect of CO<sub>2</sub> on nitrous oxide in 15 cats are similarly shown in Graph III.

It is apparent from the results reported that 5 or 10% of CO<sub>2</sub> exerts an unmistakable influence in anesthesia by ethylene or by nitrous oxide. These observations are in line with observations of Nicloux<sup>2</sup> and Henderson<sup>3</sup> and his coworkers. The former reported that he was able to obtain a good anesthesia from the inhalation of ethylene 65% oxygen 15% and CO<sub>2</sub> 20%. The latter has reported an investigation with similar findings on the depth of anesthesia by substituting equivalent amounts of CO<sub>2</sub> for nitrous oxide. A detailed report of these observations will shortly appear elsewhere.

<sup>1</sup> Kleindorfer, G. B., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **28**, 623.

<sup>2</sup> Nicloux, Maurice, *Soc. de Biologie*, 1925, **93**, 1650.

<sup>3</sup> Henderson, V. E., *et al.*, *Anesthesia and Analgesia*, 1930, **9**, 136.