the design of the burner clamp and to the Directors of May and Baker, Ltd., for permission to publish this paper.

REFERENCE

1. Johnson and Ballard, *Quart. J. Pharm. Pharmacol.*, 1946, **19**, 373.

LETTER TO THE EDITOR

Interaction between Chloroform and Ion Exchange Resin to give Carbon Monoxide

SIR,—"De-Acidite FF" is described as a unifunctional highly basic anion exchange resin and is stated to be stable towards all organic solvents and at temperatures up to 60° C. both in aqueous and non-aqueous media[1]. According to Saunders[2] its functional group is quaternary ammonium and hence in its regenerated form the resin contains mobile hydroxyl ions[1].

In the course of experiments aimed at removing sulphonphthalein anions from chloroform solution by means of De-Acidite FF, the column having been first dehydrated with ethanol, the vigorous evolution of gas was observed; the gas was identified as carbon monoxide.

The hydrolysis of chloroform by aqueous sodium hydroxide to yield formate and the dehydration of formates by sulphuric acid to give carbon monoxide are well-known reactions; it is interesting to find both hydrolysis and dehydration occurring together in the presence of the ion exchange resin. This reaction is being studied in greater detail and possible analytical and preparative applications are being considered.

Analytical Control Division,
May and Baker, Ltd.,
Dagenham.

C. W. BALLARD.
J. ISAACS.
P. G. W. SCOTT.

April 9, 1954.

REFERENCES

1. "Properties of, and Instructions for using Bead Resins, 6." The Permutit Company Limited, p. 4.
2. Saunders, *J. Pharm. Pharmacol.*, 1953, **5**, 569.

(ABSTRACTS *continued from p.* 429).

Racemorphan (Dromoran) Derivatives, Action and Addiction Liabilities of. H. Isbell and H. F. Fraser. (*J. Pharmacol.*, 1953, **107**, 524.) Racemorphan, *dl*-3-hydroxy-*n*-methylmorphinan, is an analgesic drug with an addiction liability equal to morphine. Levorphan (the *l*-isomer) has previously been found to be active and dextrorphan (the *d*-isomer) inactive as analgesic and respiratory depressant. This paper reports the actions of dextrorphan and levorphan, and the methyl derivatives (dextromethorphan levomethorphan and racemethorphan), in human addicts to morphine. 3 to 4 mg. of levorphan, 20 to 30 mg. of racemethorphan and 10 to 20 mg. of levomethorphan injected subcutaneously into former morphine addicts were roughtly equivalent to 30 mg. of morphine in causing euphoria. Effects on temperature, pulse rate and blood pressure were negligible, but respiration was significantly depressed. Levorphan and levomethorphan caused pupillary constriction, while codeine, dextrorphan and dextromethorphan did not. 40 to 60 mg. of racemethorphan orally relieved the withdrawal symptoms of morphine addicts. Levomethorphan was also effective, but dextrorphan and dextromethorphan were not. Both levorphan and levomethorphan had high addiction liabilities, while dextrorphan and dextromethorphan had not. The *l*-isomers therefore account for all the miotic, respiratory and addictive properties. G. F. S.