sensitivity to the drug may be provoked by its previous use or the use of procaine, which is closely related to it.

Certainly in two fatal cases (Ahroon, 1946; Doane and Cohn, 1945) there had been recent previous administration of the drug. Thomas and Fenton draw attention to the intolerance to amethocaine manifested by allergic individuals, bronchial asthmatics, etc., as well as by cachectic patients.

Following the method of Hancock (1939), the technique in preparation for bronchoscopy has been modified. Each patient is now given a 1-gr. (65-mg.) amethocaine pastille to suck thirty minutes before instrumentation. This produces a much more complete analgesia of the mouth and pharynx than benzocaine, and it is considered that any idiosyncrasy possessed by the patient would be displayed while the relatively small dose contained in the pastille was being absorbed.

Apart from the severe constitutional reactions to amethocaine on record other less serious reactions have been recognized. These include attacks of dyspnoea and asthmatic symptoms (Fujikawa, Neves, Brasher, and Buckingham, 1948), blepharoconjunctivitis (McAlpine and Berens, 1942), and occupational dermatitis and eczema in doctors and oculists (Videbeck, 1936; Cameron, 1937; Hollander, 1939; Shimkin, 1939).

Prevention of Severe Reactions.—The following prophylactic measures are suggested: (a) A barbiturate should be given by mouth in pre-operative preparation—e.g., phenobarbitone 3 gr. (0.2 g.) or sodium amylal or nembutal 1½ gr. (0.1 g.) 40 minutes before examination. (b) An amethocaine pastille, 1 gr. (65 mg.), should be given to the patient to suck 30 minutes before the examination. (c) Amethocaine when used for surface analgesia should have adrenaline 1 in 1,000 solution added in the proportion of 4 to 1 by volume, and the total dose of amethocaine should not exceed 4 ml. of a 2% solution (80 mg.) or a corresponding amount in a more dilute solution. (d) Application by means of a laryngeal spray should be avoided, since its use can easily lead to overdosage. (e) Amethocaine should never be applied to an inflamed, traumatized, or highly vascular epithelial surface—especially so in the urethra (Knepper, 1937). (f) The drug should be avoided in patients giving a history of allergy or in severely debilitated or cachectic cases.

Control of the Established Reaction.—(i) General:—Secure an unobstructed airway by endotracheal tube if necessary. Begin artificial respiration with an oxygen-carbon-dioxide mixture. (ii) To control convulsions:—The immediate intravenous administration of a rapidly acting barbiturate—20 ml. of 2½% sodium thiopentone (0.5 g.)—is usually sufficient to control convulsions. (Picrotoxin should be available in case too much barbiturate is given.) (iii) Administration of respiratory and cardiac stimulants:—nikethamide, 2–5 ml.; caffeine sodium benzoate, 7½ gr. (0.5 g.), etc.

In using amethocaine in surface analgesia, as with many other local analgesics, from time to time the unusually susceptible individual may be met with. Reactions come with devastating suddenness and the results may be disastrous. By excluding those patients mentioned under (e) and (f) above, sensitive patients should be even more rarely met with. An analysis of the fatal cases reported reveals overdosage, faulty technique, or failure to use adrenaline to be more often the cause of death than individual idiosyncrasy.

Summary

A report is given of two toxic reactions with the use of amethocaine hydrochloride as an analgesic for bronchoscopy.

A review of the literature reveals twelve reported deaths at bronchoscopy and gastroscopy, while there are many cases of severe constitutional disturbance.

The advantages and disadvantages of the drug are assessed, the difficulty of applying an adequate sensitivity test accepted, and suggestions made for the prevention and treatment of toxic reactions.

I wish to express my thanks to Mr. O. S. Tubbs for permission to report these cases and for helpful advice in the preparation of this paper.

REFERENCES

- Ahroon, W. A. (1946). *Laryngoscope*, **56**, 320.
Cameron, O. J. (1937). *Nebraska med. J.*, **22**, 229.
Doane, J. C., and Cohn, E. M. (1945). *Anesthesiology*, **6**, 421.
Fasselt, H. (1939). *Arch. Ohr.-Nas.-KehlkHeilk.*, **146**, 217.
Freeman, E. B. (1939). *J. Amer. med. Ass.*, **112**, 217.
Fujikawa, F., Neves, A., Brasher, C. A., and Buckingham, W. W. (1943). *J. thorac. Surg.*, **17**, 123.
Hancock, P. E. T. (1939). *Proc. R. Soc. Med.*, **32**, 538.
Hollander, L. (1939). *Arch. Derm. Syph.*, **40**, 92.
Holt, T. (1945). *Arch. Otolaryng.*, *Chicago*, **42**, 280.
James, N. R. (1943). *Regional Anaesthesia for Intra-abdominal Surgery*, p. 2. Churchill, London.
Knepper, R. (1937). *Munch. med. Wschr.*, **84**, 1572.
McAlpine, P. T., and Berens, C. (1942). *Amer. J. Ophthalm.*, **25**, 206.
Pfeiffer, R. L. (1937). *Arch. Ophthalm.*, *Chicago*, **18**, 62.
Phillips, F. J., Congleton, V. L., and Tuttle, W. (1941). *Curr. Res. Anesth.*, **20**, 233.
Richards, R. (1947). *British Medical Journal*, **2**, 51.
Schindler, R. (1940). *Amer. J. digest. Dis.*, **7**, 293.
Schoen, F. (1939). *Wien. klin. Wschr.*, **52**, 505.
Shimkin, N. (1939). *Ann. Oculist.*, *Paris*, **176**, 198.
Shumacher, H. B. (1941). *Surgery*, **10**, 134.
Thomas, J. W., and Fenton, M. M. (1943). *J. Allergy*, **14**, 145.
Videbeck, H. I. (1936). *Ugeskr. Laeg.*, **98**, 278.

"GAMMEXANE" AND MOSQUITO CONTROL IN THE BELGIAN CONGO*

BY

G. DAVIDSON, B.Sc.

(From the Ross Institute of Tropical Hygiene)

Experiments are now being carried out in a large palm-oil plantation at Yaligimba, in the Belgian Congo, on the control of malaria by adult mosquito destruction, using the residual insecticide "gammexane" in the houses in the labour camps and in several native villages around the plantation. The plantation, which occupies an area of some 30 square miles (77.7 km.²), is situated in a forest belt in the northern part of the Belgian Congo. The main species of anopheline mosquito concerned is *A. moucheti*, which breeds at the edges of the large rivers in the vicinity. There are also a few *A. gambiae* and *A. paludis*.

Mosquito densities in the houses before and after treatment with the insecticide are being determined by the following four methods:

1. The number of mosquitoes resting in the houses during the daytime is being estimated by laying white sheets over the whole floor surface of a house and spraying the closed house with a pyrethrum-in-kerosene spray.
2. The number of mosquitoes leaving the house each morning is being determined by the use of window-traps.
3. The number of mosquitoes entering during the night to bite the occupants of any one bed in the house is being determined by the use of mosquito-net traps, which mosquitoes can enter but not leave.
4. The mosquito-nets of the inhabitants of the camps and villages are being examined to determine the percentage

*This work has been made possible by grants from United Africa Company, Limited, and from Imperial Chemical Industries, Limited.

containing mosquitoes. The majority of these nets are made of calico and are usually incompletely closed by the occupant or in a bad state of repair.

Parasite rates and spleen rates have been estimated among children in many of the camps and villages before treatment, and are high throughout the area. These will again be estimated in both treated and untreated villages one year after treatment, as will the parasite rate among babies born in the villages during that year.

Salivary gland dissections are also being done on the mosquitoes before and after treatment. The sporozoite rate in the main anopheline, *A. moucheti*, is naturally low—0.4% in 3,712 dissections—and large numbers of dissections have had to be done.

Water-dispersible powders containing gammexane have been used for the spraying of the internal surfaces of the houses, and a concentration of 10 mg. of gammexane per square foot (930 cm.²) of surface has been aimed at. Eclipse "Warley" pneumatic sprayers of 2 gallons (9 litres) capacity are being employed for the spraying. These give an application rate of approximately 5 pints (2.84 litres) of spray per 1,000 square feet (93 m.²) of surface.

Results so far show after treatment a very marked reduction in the numbers of mosquitoes caught by the four methods outlined above. The best results have been obtained with the water-dispersible powder P530, containing 6% of gammexane. Mosquitoes caught by the window-trap method began to appear in significant numbers in the fifteenth and sixteenth weeks after treatment. Mosquitoes caught by the net-trap method were showing only a slight increase at this time, and almost no mosquitoes were found by the other two methods. The unreliability of estimating the persistence of the insecticide by determining mosquito densities by the flit-catching method alone has been clearly demonstrated.

Results of salivary gland dissections from treated and untreated villages are:

	Dissected	Positive	Percentage
Untreated villages:			
<i>A. moucheti</i> ..	3,712	15	0.40
<i>A. gambiae</i> ..	408	17	4.17
<i>A. paludis</i> ..	45	0	0
Treated villages:			
<i>A. moucheti</i> ..	2,001	1	0.05
<i>A. gambiae</i> ..	44	0	0
<i>A. paludis</i> ..	12	0	0

The only positive *moucheti* mosquito from a treated village was found in a net-trap three weeks after the first treatment of the village, at a time when another village only 2 kilometres away remained untreated. It is therefore possible that this mosquito flew from the untreated village and entered the net-trap without coming into contact with the treated surface of the house.

The site for these experiments was originally chosen with a view to possibly eradicating the mosquitoes in the plantation solely by adult mosquito destruction in houses. It was soon decided, however, that the plantation was not sufficiently isolated for this to be achieved, and the reappearance of mosquitoes in significant numbers after the treatment of single villages or groups of villages, isolated to the extent of 3 to 4 kilometres, has confirmed this view. However, it is proposed to try to eradicate the mosquitoes in the plantation by spraying also the villages which lie near to the plantation to form a protective barrier against invasion of mosquitoes into the treated plantation. It is thought that an initial spraying of the whole area three times during the first year can be reduced to twice a year and be quite an economical proposition.

It is hoped to publish shortly a more detailed account of this work.

Medical Memoranda

Twisted Ovarian Cysts in Children

Ovarian cyst with torsion of the pedicle is an uncommon condition in children, only about 125 cases having been reported in the past hundred years. The literature contains such interesting cases as an ovarian cyst in a 7-months premature infant and torsion of an ovarian cyst in a 10-days-old baby (Bursch). The majority of twisted ovarian cysts in children occur on the right side, and because of this the diagnosis made is usually that of acute appendicitis, or appendicular abscess if a mass is palpable. There may be symptoms of a vague character consisting of nausea and vomiting, preceded by vague abdominal ache for a few days, with one or more severe attacks of sudden abdominal pain lasting for a few hours, this being due to a tighter twist of the pedicle. The following reports illustrate typical cases.

CASE HISTORIES

(1) The patient, a girl aged 10, was first seen at 9 p.m. on Jan. 5, 1948. She had had a dull pain in the right side of her abdomen and right lumbar region on and off for three weeks, but 48 hours before admission she had had nausea and vomiting with increased pain in the right loin. Since then she had vomited white frothy matter. The pain remained in the back and right side of her abdomen and was at no time central. She had been constipated for some weeks, and 24 hours before admission had been given a soap enema, which yielded a very good result. She had had no urinary symptoms. Her activities were normal for her age, and she had been sleeping well.

On admission the temperature was 98° F. (36.7° C.), pulse 122, and respirations 24. She was a thin, pallid child; her tongue was slightly furred, with halitosis present. There was a moderate degree of rigidity in the right lower quadrant, with tenderness in the right side of the abdomen and right lumbar region, most pronounced about 1 in. (2.5 cm.) below McBurney's point. Rectal examination had been carried out, and the only thing noted was the presence of hard faecal masses. A diagnosis of acute appendicitis was made and laparotomy was carried out.

A Rutherford Morison incision was first employed and a plum-coloured mass was seen in the pelvis. Through this incision it was not possible to observe whether the mass was adherent to gut or not, and so a right subumbilical paramedian incision was carried out, when the mass proved to be a twisted right ovarian cyst, the size and shape of a kidney, with four twists in the pedicle. The pedicle was untwisted and afterwards transfixed, the cyst being then removed. The right tube was left intact. A small cyst was present in the left ovary. Both incisions were closed without drainage. Recovery was uneventful and the patient was discharged from hospital ten days after operation.

The histological report stated that there was massive haemorrhage in the cyst, in which were seen scattered capillaries, veins, and arterioles. Collections of polymorphs were present round most of the larger vessels, often with necrosis of the vessel wall. There was nothing to identify the tissue with certainty, but it was probably a connective-tissue tumour and possibly ovarian in origin. I am indebted to Dr. A. J. McCall for the histological report.

(2) On Dec. 5 a girl aged 9 years was admitted to hospital with the diagnosis of subacute intestinal obstruction. A cystic mass was felt on rectal examination. In the light of the experience gained in the case described above a diagnosis of twisted ovarian cyst was made. Laparotomy confirmed the diagnosis. A twisted ovarian cyst with four torsions of the pedicle was found on the left side. The cyst was removed as in the former case.

G. GORDON CROWE, F.R.C.S.Ed.,
Surgeon, City General Hospital, Stoke-on-Trent.

BIBLIOGRAPHY

Fowle, J. A. (1944). *Amer. J. Surg.*, **64**, 285.

Precautions that the practitioner must take in dealing with drugs under the Dangerous Drugs Acts and Regulations are described in a memorandum "Dangerous Drugs Acts, 1920 to 1932," D.D.101, 5th edition (H.M.S.O., 3d.). Drugs covered by these Acts and regulations are listed, and the pamphlet describes how prescriptions for them must be written, dated, and signed, how the medical practitioner should obtain and store the drugs, and what records he should keep. The memorandum concludes with an appendix extracted from the Report of the Departmental Committee on Morphine and Heroin Addiction, discussing the precautions to be observed when administering these drugs in medical practice.