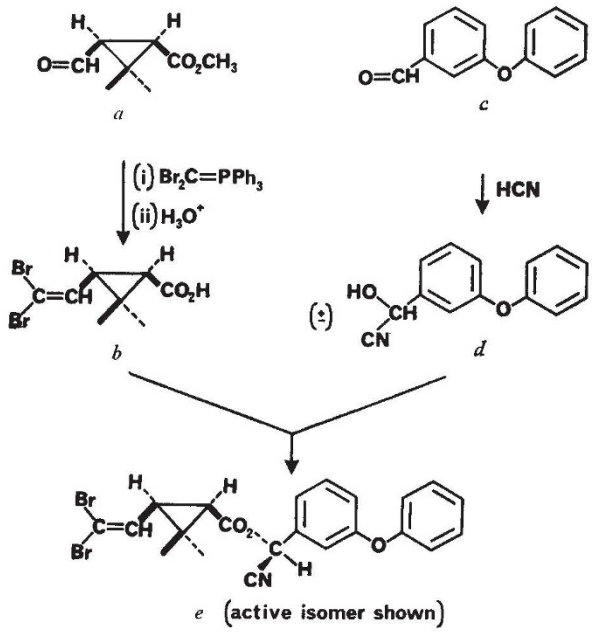

FIG. 1 Synthesis of the active compound.

paper[12]) has important theoretical and practical implications, now being examined.

The new compounds are protected by UK Patent Applications Nos 20539/73, 39539/73 and 49098/73 and corresponding foreign applications.

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1 Elliott, M., Farnham, A. W., Janes, N. F., Needham, P. H., and Pulman, D. A., *Nature*, **244**, 456 (1973).
2 Elliott, M., Farnham, A. W., Janes, N. F., Needham, P. H., Pulman, D. A., and Stevenson, J. H. *Nature*, **246**, 169 (1973).
3 Elliott, M., Farnham, A. W., Janes, N. F., Needham, P. H., Pulman, D. A., and Stevenson, J. H., *Proc. Seventh Br. Ins. Fung. Conf. (Brighton)* 721 (1973).
4 Cahn, R. S., Ingold, C., and Prelog, V., *Angew. Chem. int. Ed. Engl.*, **5**, 385 (1966).
5 Brown, D. G., Bodenstein, O. F., and Norton, S. J., *J. agric. Fd Chem.*, **21**, 767 (1973).
6 Lock, G., and Kempter, F. H., *Ml. Chem.*, **67**, 24 (1935).
7 Elliott, M., Farnham, A. W., Janes, N. F., Needham, P. H., and Pearson, B. C., *Nature*, **213**, 493 (1967).
8 Elliott, M., *Chem. and Ind.*, 776 (1969).
9 Elliott, M., *Bull. Wld Hlth Org.*, **44**, 315 (1971).
10 Becker, W., and Pfeifl, E., *J. Am. chem. Soc.*, **88**, 4299 (1966).
11 *Chemistry of Carbon Compounds* (edit. by Rodd, E. H.) **III**, 902 (Elsevier, 1956).
12 Barnes, J. M., and Verschoyle, R. D., *Nature*, **248**, 711 (1974).

Toxicity of new pyrethroid insecticide

THE mammalian toxicity of NRDC 156 and NRDC 161 (see accompanying paper[1]) was assessed in albino female, rats 10 to 12 week old.

Given as solutions in glycerol formal by the intravenous route, the lethal dose of NRDC 156 was 6 to 8 mg kg^{-1} and of NRDC 161, 2 to 2.5 mg kg^{-1}. Orally, as solutions in arachis oil, an LD_{50} could not be computed, but the rats showed severe toxic effects, with some deaths in the dose range 80 to 160 mg kg^{-1} for 156 and 25 to 63 mg kg^{-1} for 161.

The signs of poisoning in these rats were not the same as those described for other pyrethroids[2]. The first sign was excessive salivation without lachrymation, rapidly followed by continuous irregular jerking movements of the limbs, progressing to rolling convulsions, and an occasional tonic-clonic convulsion. Death occurred from 12 min to 2 h after intravenous dosing and from 3½ to 28 h after oral dosing. Survivors were usually almost normal within 4 to 6 h after intravenous dosage, but recovery from an oral dose took up to 48 h.

The impression gained from observing the animals was that the site of action of NRDC 156 and 161 was mainly central, with little or none of the peripheral component that has been demonstrated for other pyrethroids.

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1 Elliott, M., Farnham, A. W., Janes, N. F., Needham, P. H., and Pulman, D. A., *Nature*, **248**, 710.
2 Verschoyle, R. D., and Barnes, J. M., *Pestic. Biochem. Physiol.*, **2**, 208 (1972).

First frog fossils from Australia

RECENT speculation about the ancestral frog fauna of Australia, even embracing the Cretaceous[1], has been based purely on zoogeographic deductions, for study of the origins and history of this fauna has been seriously handicapped by the complete absence of an endemic fossil record. Although it has been suggested[2,3] that the Lower Eocene *Indobatrachus* of the Intertrappean beds of Bombay represents the Australian leptodactylid subfamily Myobatrachinae, such a relationship is considered dubious or untenable by other authors[4,5]. It is therefore of interest to report the recent discovery of isolated fragments of frog bones among a rich mid-Miocene vertebrate fauna in Central Australia, so being the first frog fossils found in Australia.

The material was obtained at Tedford Quarry, V-5375, on the west side of Lake Palankarinna in the extremely arid north of the State of South Australia. The site is in the Etadunna Formation, and the biological material recovered there is termed the Ngapakaldi Fauna by Stirton, Tedford and Woodburne[6].

Most of the isolated anuran bones comprise limb fragments (particularly heads of humeri and femora) which, at present, cannot be referred to families, but there is included an almost complete left ilium (Fig. 1) which is 7 mm long and remarkably well preserved. This specimen is of particular value because of all isolated anuran bones the ilium is considered to be of the greatest diagnostic value at the familial, generic and even specific level[7,8]. The fossil is, however, so unusual that its familial disposition is not readily resolved.

Four families of frogs are currently recognised from Australia: Hylidae, Leptodactylidae, Microhylidae and Ranidae. Nevertheless, the disjunct distribution of the Leiopelmatidae now confined to North America and New Zealand indicates that leiopelmatids may have formerly occurred in Australia. Hence it would be unwise to restrict comparative osteological studies to families now represented.