The fat formation occurred exclusively in viable cells. Those close to the site of oleic acid injection showed pycknotic degeneration but no sudanophilia. Although lipogenesis occurred equally in all the native cells of the cornea, none was found in the invading polymorphonuclear cells and only moderate amounts in the macrophages. Comparative studies on nonocular tissue are now under investigation.

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Toxicity of Sarin in Bullfrogs

The Chemical Corps has a continuing and necessary interest in studies concerned with the mechanism of action of "nerve gases," compounds that have a powerful anticholinesterase activity. A major part of the fund of knowledge concerning the fundamental physiology of nervous activity has been obtained through studies on poikilotherms, especially the frog. Consequently, data concerning the effect of anticholinesterase drugs on cold-blooded animals are directly related to Chemical Corps research.

Sarin (isopropyl methyl phosphonofluoridate) is a powerful anticholinesterase drug (*1*). Details of its pharmacology and toxicology in the mouse, rat, guinea pig, rabbit, cat, dog, sheep, goat, and monkey have been published by British investigators (*2*). This communication summarizes the toxicity of this compound for the bullfrog, *Rana catesbeiana.*

Frogs, weighing 400 to 500 g each, were injected with the drug, dissolved in amphibian saline, into the dorsal lymph sac. Controls received similar injections of plain amphibian saline. The frogs were then put into glass aquariums kept at 22°C and observed until death or for 3 days after injection. Table 1 gives the results. If the logarithm of the dose is plotted as a function of percentage dead for that dose, the LD_{50} is seen to be about 6 mg/kg body weight.

Table 1. Illustrating the toxicity of sarin to bullfrogs.

No. of frogs	Dose (mg/frog)	Results
6	0.060	No effect
6	.080	No effect
6	.100	No effect
5	.500	All alive and active 3 days later
17	1.000	1 dead
11	2.000	1 dead
6	4.000	4 dead
6	8.000	4 dead

It has recently been reported that sarin is the most toxic of three known compounds of the nerve-gas type (*3*). The toxic dose for man is estimated to be 0.7 to 7.00 mg (*3*). For a 70-kg man, this value would amount to 10 to 100 μg/kg to kill. Rabbits given 40 μg/kg of sarin intravenously stop breathing in about 10 sec (*2*). The blood pressure of anesthetized cats, given 200 μg/kg of sarin intravenously, is rapidly depressed to about 30 mm Hg. At such pressure the heart continues to beat effectively for several minutes after respiration ceases (*2*).

It is evident that the bullfrog is resistant to relatively large amounts of sarin given by injection. The only signs of poisoning noticed were observed in frogs given doses exceeding 1 mg. Such animals were partially anesthetized. They showed no spontaneous movements and responded sluggishly to tactile stimuli. The righting reflexes were present. After 24 hr these signs disappeared, and the frogs seemed to be normal. No blood or tissue cholinesterase values were estimated.

The explanation of the great resistance to, and surprising recovery from, sarin poisoning in bullfrogs is not certain. In mammals two key effects of such poisoning are paralysis of external respiration and depression of circulation. In frogs such effects merely anesthetize the animals until detoxification takes place. In addition, the functional integrity of frog nerves persists even at remarkably low cholinesterase levels (*4*).

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Morphologic Variation and Mode of Growth of Devonian Trepostomatous Bryozoa

Ramose fossil Bryozoa rarely are so situated in enclosing sediments that colonies can be assembled and studied in detail. The Hamilton group of Middle Devonian age in New York State contains colonies of at least three genera. Several have been restored and thin-sections made throughout their length.

The cortical, thick-walled portion of a colony (Fig. 1) contains diaphragms and other structures used in the classification of the order. The stage of development of the cortical region at any one level within the colony can be expected to control structural variations, at least of a quantitative nature. In the axial region of the colony the zooecia are thin-walled and diaphragms and other structures are rare.

Data commonly considered to be of value in dis-