namely, bat-guano caves (see *3*).

I have been carrying out research on a guano deposit 150 cm high situated in a small chamber (chamber C) of Carrai Bat Cave in northeastern New South Wales, Australia. Between 1000 and 3000 bent-winged bats, *Miniopterus schreibersii*, roost in chamber C from late January to June and again from October to early December (*4*). This guano heap has built up over many years of cyclical occupancy of chamber C by bats and supports a permanent community of organisms which comprises bacteria, fungi, protozoans, nematodes, mites, bettles, flies, moths, and spiders.

The temperature profile at three depths in this heap of guano, together with the air temperature of the chamber, was monitored with an automatic temperature recorder from 29 September to 31 October 1969. Bats arrived in chamber C in large numbers on 5 October, and from this date to 31 October the combined metabolic activity of the organisms inhabiting the heap increased the temperature of the surface layers of freshly fallen guano from 14.6° to 23.9°C. The temperature at about 5 cm and 15 cm below the surface of the heap increased from 14.9° to 16.6°C and from 16.1° to 19.1°C, respectively. The air temperature of the chamber increased from 13.9° to 15.3°C (30 cm above the top of the heap), while in the domed ceiling the temperature increased from 14.7° to 21.6°C (readings were taken at 10 a.m. when the bats were roosting in the chamber). These data reveal that the environmental variability associated with bat guano communities is high.

Nursery caves of the two species of cave-dwelling bats, *Tadarida brasiliensis mexicana* and *Miniopterus schreibersii*, are also known to exhibit a high degree of environmental variability. The presence of bats within these caves warms the air so that, over a period of a few months, temperatures rapidly increase, often by more than 10°C (*5*), giving an annual temperature range of at least 10°C. Major changes in the relative humidity and in the concentration of ammonia also occur in the atmosphere of these caves, together with changes in *p*H and in the moisture content of the guano deposits. The buildup of guano in nursery caves is immense, and a large biomass of organisms may be supported. These organisms are living in environments of high variability.

The environment of organisms inhabiting guano deposits in caves is highly variable, whereas there is low environmental variability associated with "the cave environment." Bat-guano caves are not constant-temperature laboratories in which ecological studies can be carried out on simple animal communities, but they are invaluable for the study of isolated animal communities (*6*).

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3 August 1970

DDT Action and Adenosine Triphosphate–Related Systems

Hilton and O'Brien (*1*) interpreted our data (*2*) on DDT inhibition of a Na^+, K^+, Mg^{2+}-adenosine triphosphatase to mean that DDT inhibits only the energy-requiring "sodium-potassium pump," and gave an impression that this is what we claimed to be the mechanism of DDT action. This is not what we meant, and we wish to clarify the situation here.

What we found was that DDT inhibits a yet undefined Na^+, K^+, Mg^{2+}-adenosine triphosphatase which may or may not be involved in the process of "sodium-potassium pump." We agree with Hilton and O'Brien that, if DDT attacks only the sodium pump, the end result would be just a slow blocking of the nerve action, whereas what DDT does to the nervous system is opposite: quick excitation through inhibition of Na^+ and K^+ "gate" operation. What we actually suspect, therefore, is either (i) this portion of DDT-sensitive adenosine triphosphatase is not the "pump" enzyme (but rather an enzyme-protein involved in the processes of conductance changes) or (ii) the adenosine triphosphatase in question superficially resembles the actual DDT target; the relation would resemble that between cholinesterase and the acetylcholine receptor site in the nervous system. This is the very reason that we stated in the last sentence of our report (*2*) that "the involvement of an adenosine triphosphatase or an ATP-utilizing system, or both, in DDT poisoning is a likely possibility."

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20 July 1970

Superheated Ice

The interesting experiment of Schubert and Lingenfelter (*1*) demonstrates metastable freezing of water to ice under a pressure low enough so that both the water and the ice are superheated with respect to the vapor phase. Contrary to the authors' statement, this phenomenon has been observed previously, in fact, under even more extreme and striking conditions.

Roedder (*2*) caused microscopic aqueous inclusions in minerals to freeze, eliminating the vapor phase as a result of the expansion on freezing, and he then allowed the ice thus formed to remelt. Under these conditions the vapor phase often fails to nucleate initially, and a great reduction in pressure then occurs when the ice melts. In this way Roedder (*2*) was able to heat ice, in metastable equilibrium with the aqueous liquid, to temperatures as high as +6.5°C and thus to create a negative pressure (hydrostatic tension) in the ice-liquid system as high as about 900 bars. Since the metastable melting could be reversed (*2*, p. 1414), Roedder evidently observed both the transformations $S_I \rightarrow L_I$ and $L_I \rightarrow S_I$, in the nomenclature of Schubert and Lingenfelter (*1*). Roedder does not specifically mention observation of the transformation $L_{II} \rightarrow S_I$ de-