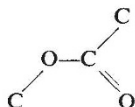


# CORRESPONDENCE

## Molecular Models

SIR,—Atomic model building (or, as some might say, guessing) is a powerful tool in determining the structures of molecules. In the cases of the  $\alpha$ -helix and DNA, for example, the structures would not have been proposed without the aid of accurate model building. In both cases, however, the model building was backed up by sound stereochemical knowledge. We would like to draw your attention to the most important stereochemical error that occurs in the recent article in which W. H. Beers and E. Reich use model building to relate the structure of acetylcholine to its activity as a neurotransmitter<sup>1</sup>.

All five atoms of an ester group



are coplanar due to the partial double bond character of the O—C bond (ref. 2). The group has a resonance energy of about 24 kcal per mole (ref. 2) and this energy must be added for any large rotation to take place about the O—C bond.

Beers and Reich do not describe their model for acetylcholine in the text of the article, but inspection of Figs. 2 to 6 shows the molecule,  $(\text{CH}_3)_3\text{N}^+\text{CH}_2\text{CH}_2\text{OCOCH}_3$ , with a rotation about the O—C bond of approximately  $90^\circ$  from the coplanar conformation. Such a conformation, at 24 kcal per mole above the ground state, would occur for less than one molecule in  $10^{15}$ . As less than  $10^8$  molecules are released for the transmission of one nerve impulse<sup>3</sup> it seems doubtful that this model of acetylcholine is relevant to the molecule's role as a neurotransmitter.

Yours faithfully,

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<sup>1</sup> Beers, W. H., and Reich, E., *Nature*, **228**, 917 (1970).

<sup>2</sup> Pauling, L., *The Nature of the Chemical Bond*, 3rd ed. (Cornell University Press, Ithaca, 1960).

<sup>3</sup> Katz, B., *Nerve, Synapse and Muscle*, 120 (McGraw-Hill, London, 1966).

## Electrical Plant

SIR,—May I comment on the statements concerning the unreliability and breakdown of 500 MW and 660 MW generating units and the way the Central Electricity Generating Board manages its affairs (*Nature*, **228**, 1126 and 1246; 1970).

The Select Committee on Science and Technology (HMSO, 1970) concluded that there were welding defects and hair-line cracks in the boilers. The CEGB states<sup>1</sup> that "the problem in this country is accentuated by the high proportion of new plant on the system".

Could it be that too much attention has been given to designing plant which will operate at an excessively high steam temperature without an adequate regard for plant reliability?

In the United States there are 25 units<sup>2</sup> under construction of between 500 MW and 1,380 MW with a maximum steam temperature of  $1,010^\circ\text{F}$  which is some  $40^\circ\text{F}$  below the CEGB units which are under construction.

Yours faithfully,

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<sup>1</sup> CEGB Annual Report and Accounts, 1969–70, 3 (1970).

<sup>2</sup> *Electrical World*, **174**, No. 8, 35 (1970).

## Acanthaster in the Indian Ocean

SIR,—Having dived off the east coast of Africa since 1959, we very rarely saw *Acanthaster planci* (crown of thorns starfish) until 1968. One specimen was seen in 1961 at Bazaruto Island.

In January 1968 we spent some time in the Bay of Nacala ( $14^\circ 25' \text{S}$ ,  $40^\circ 40' \text{E}$ ), northern Mozambique. This is being developed as a harbour but we saw no evidence of blasting or dredging<sup>1</sup>. Large areas of the reef were dead or apparently dying. In retrospect we have thought that this was probably attributable to *A. planci*<sup>2</sup> of which we saw and photographed a great number. At the time we were unaware of the threat that this starfish was presenting in the Pacific Ocean<sup>1–3</sup>.

The following year, while visiting several islands in the Indian Ocean, we saw vast areas of devastated coral and many specimens of *A. planci* at Juan de Novo ( $17^\circ \text{S}$ ,  $42.5^\circ \text{E}$ ). This is a small, totally isolated island with a Melanesian

population of about fifteen and with fewer than this number of visitors in the last two years. A passageway through the reef had been blasted on the leeward side of the island to allow small boats through the coral to load phosphates mined on the island. This activity had stopped about three years previously.

We are happy to report that we saw no evidence of *A. planci* or coral damage at either Mayotte in the Comores or at Aldabra.

In December 1969 we saw about ten specimens in six half-hour<sup>1,4</sup> dives at Bazaruto Island ( $22^\circ \text{S}$ ,  $36^\circ \text{E}$ ). Some of these were seen at Punto Dundo, a rocky outcrop with very little coral, between Bazaruto and Bengherra. At this point the tidal current reaches 5–7 knots. Others we saw at Gengareme. This is a sheltered bay on the lee of the island where there are mainly large brain corals (lobophyllia) isolated by sand. Shortly after this, another expedition reported collecting sixty<sup>3</sup> specimens in one dive from the reef two miles NNE of Punto Dundo. This reef has abundant and varied coral growth, and is subjected to perpetual breaking water. There was no evidence of coral damage in any of these three areas.

Another threat to the life on coral reefs is becoming more and more evident in Northern Mozambique. The local fishermen have learnt to use goggles and spearguns and indiscriminately shoot all coral fish over about three inches long. This results in a dearth of fish above a depth of about thirty-five feet. The fish deeper than this are very shy. We feel that concerted effort is required to protect life on coral reefs, such as at Watamu, Kenya and Aldabra.

Yours faithfully,

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<sup>1</sup> Cheser, R. H., *Science*, **165**, 280 (1969).

<sup>2</sup> *Australian Academy of Science, Report No. 11* (1970).

<sup>3</sup> Dixon, B., *New Scientist*, Oct. 30, 226 (1969).

<sup>4</sup> Vine, P. J., *Nature*, **228**, 341 (1970).

## Nonsense Fragments

SIR,—The December 19 issue of *Nature* contains two articles and an editorial review<sup>1–3</sup> concerned with the fate of fragments of proteins produced by *E. coli* nonsense mutants. The authors claim