"Yellow rain" or natural toxins?

SIR — We would like to comment and expand on the feasibility of naturally occurring mycotoxins in Southeast Asia (*Nature* 23/30 December 1982, p.679). According to one US State Department supporter, the feasibility is "absurd" because, on the basis of feeding trials with cows, serum levels of 10 to 100 parts per 10⁹ T-2 toxin require massive oral doses, which presumably would not occur in the foodstuffs of alleged victims of "yellow rain". This logic is somewhat convoluted inasmuch as a metabolite of T-2 toxin, HT-2, is detected in serum samples of animals several days to weeks after ingestion, not T-2. The presence of T-2 toxin in serum samples collected several weeks after "yellow rain" attack¹ is inconsistent with previous animal studies. This inconsistency has generated the theory that human metabolism of T-2 toxin is fundamentally different from animal metabolism and is characterized by long-term "tissue binding"¹. But, if human and animal T-2 metabolism are different, then it is illogical to discount the natural occurrence of T-2 toxin by comparing T-2 serum levels in experimental cows with levels in human victims. In our view, the identification of trichothecenes in the tissues of Southeast Asians may be the result of natural mycotoxin contamination of foodstuffs.

The State Department maintains that trichothecene mycotoxins² and trichothecene-producing fusaria³ do not naturally occur in Southeast Asia. But, a T-2 toxin producing *Fusarium* species was described in the 1930s in Vietnam and Canadian investigators recently reported the isolation of trichothecene-producing fungi, such as *F. semitectum* and *F. sporotrichiodes*, from "most" samples collected near the Thailand-Kampuchea border⁴.

The latest State Department report¹ argues that the detection of trichothecenes in several vegetation samples is particularly persuasive since "*Fusarium* is not a leaf pathogen". This is simply not true. *Fusarium roseum*, *F. nivale*, *F. poae*, and *F. tricinctum*, all trichothecene-producing species, have been described as leaf pathogens. Also, other genera of leaf pathogens are well known trichothecene producers. The mycoflora of the State Department's trichothecene-positive vegetation samples was not examined.

According to the State Department, mixtures of trichothecenes in certain vegetation and soil samples "are not normally found in nature and it would appear that these mycotoxins found their way into the environment by the intervention of man"¹. Numerous laboratory studies do indeed indicate that the mixtures detected cannot be attributed to the activities of any individual isolate. However, simultaneous mycotoxin production by multiple species of *Fusarium* is a well-known natural

phenomenon (see refs 5,6).

Ironically, as the State Department continues to press its case, a natural occurrence explanation of the data becomes more credible. Analyses of tissue samples of an alleged "yellow rain" victim revealed high levels of trichothecenes and aflatoxins, *Aspergillus flavus* toxins¹. Reported symptoms of the victim were consistent with aflatoxicosis and trichothecene poisoning induced by consuming moldy grains.

The military use of chemical weapons is despicable. Moreover, some of the evidence to date suggests the use of trichothecene weapons in Southeast Asia and merits intense investigation. However, the State Department's shrill accusations of Soviet treaty violations are premature. Instead of continually advocating theories of Soviet wickedness, alternative hypotheses such as natural occurrences need to be openly explored. For example, mycoflora of physical samples from attack sites and the levels of aflatoxins in all tissue samples need to be tested. Until then, scepticism will remain.

R.D. CALDWELL

Department of Plant Pathology,
University of Wisconsin-Madison, USA

1. Shultz, G.P. *Special Report No.104*, U.S. Department of State (1982).
2. Burt, R. *New York Times* 29 Nov 1981.
3. Marshall, E. *Science* 217, 32 (1982).
4. Schiefer, H.B. Canadian Submission to the UN. A/37/308, 1982.
5. Mirocha, C.J., Schauerhamer, B., Christensen, C.M. & Kommedahl, T. *Appl. envir. Microbiol.* 38, 557-558 (1979).
6. Suzuki, et al. *Jap. J. Food Hyg. Soc.* 21, 43-50 (1980).

Beware cloned toxins

SIR — No doubt a number of plant and bacterial toxins (ricin, diphtheria and so on) will soon be cloned and expressed in bacteria. The large interest in toxins is due to the hope that when attached to antibody molecules these "immunotoxins" will be a new generation of magic bullets to destroy cancer cells, fight parasite infections and manipulate cells of immune diseases, transplantation, and so on. This is laudable but a potential Pandora's box is about to be opened. It is my fear that these toxins could be used for military purposes. Just 10 µg or less can kill a 70 kg human being and a soldier hit by a toxin shell would soon die because of the difficulty of making specific antidotes to the large number of available toxins. The use of these weapons and their proliferation should be highly controlled and banned by international law, such as that banning chemical and germ warfare. I would encourage all governments to strive to have existing treaties on chemical and biological warfare amended to include these substances.

JAMES W. LARRICK

Cetus Immune Research Laboratories,
Palo Alto, California, USA

Leuven's universities

SIR — The news item "Belgian universities hit trouble" (*Nature* 299, 767; 1982) contains a number of errors about the Katholieke Universiteit Leuven which I would like to correct.

The Catholic University of Leuven, during the 1960s, was split into a complete and autonomous Dutch-language university, the Katholieke Universiteit Leuven (KU Leuven) and a complete and autonomous French-language university, the Université Catholique de Louvain (UCL), both with their own juridical status. That is not to say, however, that the lectures were not divided and taught both in Dutch and in French previously at Leuven — such duplication of lectures began in the 1920s and was virtually complete by 1935 when the Catholic University of Leuven became officially bilingual (Dutch and French).

When the split of the Catholic University of Leuven was officially complete, in 1970, it was decided that KU Leuven would remain in the Dutch-language (Flemish) sector of Belgium, in Leuven itself. UCL was to move to the French-language part of Belgium (Wallonia) and build a new university at Ottignies, "Louvain-la-Neuve". UCL's move was completed at the end of the 1970s, and it is now established in its new buildings.

The caption accompanying the photograph of Leuven's famous university library published in the *Nature* article, therefore, is incorrect, ignoring UCL's move. The Central University Library on Ladeuzeplein is in fact part of the Dutch-language university, KU Leuven.

Moreover, contrary to what was implied in the *Nature* article, when KU Leuven has a vacancy in the academic or scientific staff and cannot fill it with a qualified Catholic scientist, it is sufficiently broad-minded to appoint a non-Catholic who does possess the required scientific qualifications. Indeed, non-Catholics have already been appointed to posts in some specialities at KU Leuven, for example, in biology in the Faculty of Sciences.

J.P. GROOTAERS

(Director)

Katholieke Universiteit Leuven,
Leuven, Belgium

A sticky problem

SIR — Professor F.E.G. Cox is mistaken in his *News and Views* article on Chagas' disease (*Nature* 23/30 December 1982, p.685); it is peanut lectin which is specific for terminal galactose residues. Peanut butter agglutinin, to which he refers, is specific for the roof of your mouth, agglutinating it to either (1) the floor of your mouth, or (2) biscuits, depending upon the nature of the experiment.

J. JOHN COHEN

University of Colorado
Health Sciences Center,
Denver, Colorado, USA