

## NEW WORLD

# More Ammunition for SST Foes

by our Washington Correspondent

WHILE Concorde was still reeling from the double blows dealt by PanAm and TWA, which decided last week not to take up their options, a committee of the National Academy of Sciences has given more ammunition to the anti-SST forces. Charged with the task of examining the biological consequences of increased ultraviolet radiation reaching the Earth's surface, the committee has concluded\* that "sufficient knowledge is at hand to warrant utmost concern over the possible detrimental effects on our environment of the operation of large numbers of supersonic aircraft".

Ultraviolet radiation first burst into the SST debate in 1971, just before Congress voted to block development of two prototype American SSTs. It was then suggested, chiefly by Professor Harold Johnston of the University of California at Berkeley, that oxides of nitrogen emitted into the stratosphere by SST exhausts would partially destroy the layer of ozone in the upper atmosphere. Since the ozone layer filters out some of the ultraviolet radiation coming from the sun—particularly short wavelength ultraviolet radiation—the result would be increased ultraviolet intensity at the Earth's surface which in turn would lead to increased incidence of skin cancer and other biological damage.

Dr Johnston's calculations (*Science*, 173, 517; 1971) sparked off a scientific debate which is still essentially unresolved—in spite of a suggestion put forward in a letter to *The Times* by Sir Peter Masefield, Chairman of the British Airports Authority, which was published on January 27. Masefield stated that Johnston has admitted making a mistake in his original calculations which essentially invalidates his conclusions. Johnston said last week that such a suggestion is "quite incorrect" and that far from recanting, he has further refined his calculations and still considers his original publication a good first-order approximation.

The NAS committee, which met under the chairmanship of Dr Kendrick C. Smith, of Stanford Medical School, in spite of the general conclusion quoted above, tries to steer clear of commenting on the validity or other-

wise of Dr Johnston's calculations. It simply explores their biological implications, and in so doing, brings out several points which have previously been given scant attention.

The committee starts from the premise that a small decrease of ozone concentration in the stratosphere would produce a disproportionately large increase in ultraviolet radiation reaching the Earth's surface. Particularly affected would be the amount of radiation penetrating the ozone layer with wavelengths between 286 and 320 nm, which the committee points out are "the most biologically damaging wavelengths of sunlight". A 5 per cent reduction in stratospheric ozone at 40°N—the mid-point of the United States—would increase the intensity of ultraviolet radiation at 297.5 nm by 26 per cent, while a 50 per cent decrease in the ozone layer would cause radiation at this wavelength to increase by a factor of ten. "This point", the committee suggests, "is of the utmost importance in considering the likely biological effects that might result from man-made changes in atmospheric ozone concentrations".

But since the intensity of ultraviolet radiation is reckoned to be about 50 times greater at the Equator than it is

inside the Arctic circle—the difference is caused by a thinning of the ozone layer and increasing solar altitude towards the Equator—would a small intensity increase of about 25 per cent really be significant? The committee believes that it might, because not only is an average increase in exposure likely directly to affect man, but it may also be detrimental to plant life.

So far, the debate about SSTs and the environment has concentrated chiefly on the politically sensitive cancer aspect, but the NAS committee raises a number of much broader questions. It points out, for example, that ultraviolet radiation damages the DNA in all living things, but the damage is repaired by a variety of biochemical processes. The damage and repair are in delicate balance, which could be upset by an increase in average exposure to ultraviolet radiation—"if the amount of ultraviolet radiation damage exceeds the cell's capacity to repair this damage . . . then the cell will die". Moreover, since many plants and animals reduce their exposure to sunlight by behaviour responses triggered by heat or light, they may not be responsive simply to an increase in the ultraviolet component of sunlight.

Because ultraviolet radiation can

AEC

## Woman in the Chair

by our Washington Correspondent

PRESIDENT NIXON has finally filled one of the many top-level science positions in Washington that have been vacant as a result of reshuffling, firings and resignations that followed his re-election. As expected, he has appointed Dr Dixie Lee Ray to be chairman of the Atomic Energy Commission in place of Dr James Schlesinger, who has been made director of the CIA. A marine biologist who was appointed as an AEC Commissioner last year, Dr Ray has greeted her appointment by thanking Nixon for the honour and vowing to carry on the "forward progress" which Schlesinger fostered at the agency. Otherwise, she has kept a low profile during her six months as commissioner and has thus given few clues to her thinking on nuclear matters.

Before becoming an AEC Commissioner, Dr Ray was director of the Pacific Science Center in Seattle and associate professor of zoology at the

University of Washington; her specialty was marine vertebrates. This background was expected to make her particularly receptive to environmental concerns in the commission, but so far she has made no public statements on environmental matters.

Described by her colleagues as a strong and even forceful personality, Dr Ray faces a challenging period as chairman of the commission. Not only will she have politically sensitive problems of nuclear safety and the environment to deal with, but it is likely that she may preside over the dismantling of the agency itself. The plans for reorganizing the federal bureaucracy, which President Nixon submitted to Congress two years ago, and which he has promised to resubmit this year, would have transferred the AEC's civil nuclear power functions to the proposed Department of Natural Resources. Such a move would make the commission little more than a weapons supply agency for the Department of Defense; what it would mean for the high energy physics laboratories has never been made clear.

\**Biological Impacts of Increased Intensities of Solar Ultraviolet Radiation*, available from the National Academy of Sciences, 2101 Constitution Avenue, Washington DC 20418.