

"very striking increase" in the incidence of spina bifida (less than 5 cases a year until 1966, 13 cases in 1967, 12 in 1968) and of cleft palate (over the five year period the number of cases were 5, 2, 12, 23, 13). The other anomalies treated in the hospital, the only special children's hospital in Vietnam, exhibited no demonstrably significant change over the period. The commission notes that the increased incidence of spina bifida and cleft palate could be the result of improved diagnosis, but chooses to describe them as unexplained. Despite contrary reports in the Vietnamese press, the commission found no evidence for the occurrence in recent years of rare and striking birth defects such as the absence of limbs caused by thalidomide, but notes that much of the population directly exposed to herbicides was not available for study.

The impact of the herbicides on the forests of South Vietnam is not as difficult to assess. For example the mangrove forests, which cover much of the coastal area of the Mekong Delta region, have proved for unknown reasons to be particularly sensitive to herbicides, essentially all vegetation being killed by a single spraying. By the end of 1967 about a third of the country's 2,800 square kilometres of mangrove forest had been sprayed and the proportion is now close to one half. According to Arthur Westing, the botanist on the commission, "the scene of a spray attack is a weird and desolate one.... Herbicidal attack appears to prevent the reestablishment of any new plant community... for at least six years, and clear evidence of recolonization has not been observed anywhere by us or others". A rich variety of fish and crustaceans live in the channels of a mangrove forest or offshore, supported directly or indirectly by the nutrients flushed out of the forest. The commission has no proof that these populations have dwindled since the death of the mangroves but believes this is likely to have happened. Marine erosion is another possible consequence the commission was unable to assess. Situated at the cutting edge between land and sea, the mangroves may serve the purpose of stabilizing the shoreline against the action of winds and tides. Although no serious evidence of marine erosion has yet appeared, this is a threat that could materialize as the dead roots rot away. There has been no major typhoon since the herbicides were sprayed.

In the tropical hardwood forests, which occupy about 100,000 square kilometres of South Vietnam, the effect of herbicides has been less devastating but equally hard to assess in the long term. Some 20,000 square kilometres are thought to have been sprayed, a quarter of them more than once. Westing estimates that at least one out of every 8 or 10 trees is killed by a single spraying, rising to anywhere from 50 to 80 per cent or higher in the areas sprayed more than

once. The immediate consequence of the defoliation is the loss of the nutrients contained in the fallen leaves. Because of rapid decomposition and heavy rainfall, the soil of South Vietnam's tropical forests cannot retain any significant fraction of the nutrients, most of which are lost to the system.

Two important conclusions reached by the commission about the crop destruction programme are, first, that it is probably ineffective in its stated objective of destroying crops intended for enemy consumption and, second, that its brunt has been borne by the montagnard tribespeople of the central highlands of South Vietnam. The commission also concludes that the precautions taken to avoid destroying crops grown by civilians for their own use have been a failure. Some 2,000 square kilometres of cropland has been sprayed since the programme began, thought to represent enough food to feed 600,000 people for a year. The commission believes that nearly all this food would have been consumed by civilian populations. The crop destruction programme has been largely confined to the food scarce central highlands, most of whose one million inhabitants are montagnards. The commission's verdict on the usefulness of the crop destruction programme in denying food to the enemy confirms that reached by several studies conducted for the Army. A survey completed by the Rand Corporation in 1967 concluded that only 5 per cent of enemy prisoners and defectors had depended on locally grown crops. A similar review last year inferred that less than one per cent of enemy soldiers grew their own crops although many more depended on civilian crops indirectly.

Other relevant evidence, concerning the persistence in the environment of the contaminant dioxin, was presented by Fred Tschirley of the Department of Agriculture. In experiments yet to be published he finds that dioxin lasts for a long time in soil, regardless of the microbiological activity; after 160 days some 95 per cent of the chemical could be recovered. But only a small proportion—a maximum of 0.16 per cent—is picked up by plants, the amount reaching a peak after 16 days and then declining. In sunlight dioxin is degraded quite rapidly but the important point of whether the chemical accumulates in fatty tissues is not yet known.

Finally, the commission noted that it was not directed to assess the military usefulness or desirability of herbicides but that this was a matter that could be objectively and quantitatively studied. Such a study is now unlikely to be made, for the Secretary of Defense announced on December 26, four days before the Herbicide Assessment Commission made its findings public, that there would be an "orderly yet rapid phase-out" of herbicide operations.

SALARIES

Scientists Earn More

THE slackening demand for scientists does not seem to have driven down their price on the market, according to data gathered by the National Register in spring 1970. The median salary reported by the 313,000 scientists answering the survey was \$15,000, an increase of \$1,800 (15 per cent) on the figure for 1968. Over the same period unemployment, though still small, has nearly doubled, from 2,800 (0.9 per cent of the registrants) to 4,900 or 1.6 per cent.

The range of salaries indicated by the survey extends from \$24,500 or more in the highest decile to \$9,500 or less in the lowest decile. Statisticians are the best paid discipline, earning a median salary of \$16,900, followed by computer programmers (median \$16,500) and economists (median \$16,300). Ranked by type of occupation, self-employed scientists gain the most just desert for their labours (median salary \$20,000); next are those employed in industry (\$16,700), by non-profit organizations (\$16,400), and in educational institutions (\$15,500 on a calendar year basis). More than a third of the registrants were engaged in some form of research—14 per cent in basic research, 13 per cent in applied research and 10 per cent in the management of the research and development.

The National Register covers about four-fifths of all doctorate scientists in the United States (including physical, biological and social scientists) and two-thirds of all qualified scientists. Full results of the survey, now in the press, will be published by the US Government Printing Office early this year (*Reviews of Data on Science Resources No. 19, Salaries and Selected Characteristics of US Scientists 1970*).

Washington Newsletter

A TWICE monthly newsletter specializing in relations between science and government in Washington is to start publication in February. Called *Science and Government Report*, the newsletter will be published by Daniel S. Greenberg, a former member of the news and comment staff of *Science* since 1961 and head of it for much of that time. Greenberg, who left *Science* last month, has recently spent two years based in London as the magazine's foreign news editor. The newsletter is intended for scientists, research and academic administrators and industrial research executives. Subscriptions are \$25 a year for US residents and \$35 for those with addresses outside the United States.