

the subject of a subsequent story, are becoming clearer.

Another attempt to detect chemical perturbations of the Arctic stratosphere seems to have fallen short of the vortex, but in an interesting way. William Brune and his colleagues at Harvard University flew their resonance fluorescence analyzer north from San Francisco on the ER-2, the scientific version of the U-2 spy plane. The plane may have just made it into the vortex, but it encountered temperatures no colder than -67°C , too warm for polar stratospheric clouds. The analyzer did detect elevated levels of chlorine monoxide and ozone, but Brune is assuming that air is simply descending from higher altitudes where these compounds are enriched. Heterogeneous chemistry is probably not involved. However, the edge of the Arctic vortex over northern Canada does look familiar. "What we saw at 61°N is very similar to what we saw on the shoulders" of the Antarctic hole, said Brune.

As the chemistry of the Arctic begins to look familiar, springtime ozone losses are being suggested in the north as well. Richard Stolarski of Goddard Space Flight Center in Greenbelt, Maryland, presented ozone observations made by the satellite-borne Total Ozone Mapping Spectrometer (TOMS). Comparing 1986–1987 values with those of 1979–1980, Stolarski found "a reasonably large decrease coming out of polar winter," just as has happened in the south. The difference was about 6% above a latitude of 60°N . Neil Harris of the University of California at Irvine and his colleagues also reported winter-spring losses on the basis of long-term ground-based observations.

The next step will be to nail down the existence of heterogeneous chemistry in the Arctic vortex and any resulting ozone destruction. Michael Kurylo of the National Aeronautics and Space Administration announced that an airborne expedition like the one that settled the controversy about the Antarctic ozone hole will be launched from Stavanger, Norway, next January. Whether this effort will be as decisive as last fall's may depend on how cooperative the Arctic vortex proves to be. Meteorologists can direct research planes toward the vortex, as can the operators of TOMS, which sometimes sees reduced ozone in it. Unlike the Antarctic vortex, the Arctic version can break down and reform during the winter. It also slides around the polar region, which could easily place it out of range of the ER-2. Stratospheric clouds are probably spottier in the warmer Arctic as well. And next winter's vortex is expected to be less stable than usual. Arctic ozone hunters may need some luck to bag their quarry on the first try. ■

RICHARD A. KERR

Change in Polio Strategy?

The Institute of Medicine (IOM) is urging the government to consider the biggest change in polio vaccine policy since the 1962 switch from the killed Salk to the live Sabin vaccine. The new change, which IOM suggests in a report requested by the Public Health Service, is intended to reduce the five to ten cases of polio that result each year from immunization with the live vaccine.

This new switch would not occur for several years, however, when a new, souped-up version of the killed vaccine should be licensed in the United States. At that time IOM suggests changing to a combined schedule with several shots of the killed vaccine, followed by two doses of live vaccine. The souped-up killed vaccine, now being developed in Canada by Connaught Laboratories and sold in Europe by Merieux, is an enhanced Salk vaccine administered in combination with the diphtheria-pertussis-tetanus (DPT) vaccine. Until that vaccine is available here, IOM recommends staying with the status quo—which is a primary reliance on the orally administered Sabin vaccine, except in special circumstances.

As the wild polio virus has been nearly eliminated from the country, the biggest risk—and it is still small—of contracting the disease comes from the vaccine itself. The risk is estimated at one case of paralytic polio per 2.7 million doses of oral vaccine, or one case per 560,000 first doses. (The highest risk is associated with the first dose.)

Despite the small risk it carries, the Sabin vaccine has been the vaccine of choice since 1962 because it provides a stronger, longer lasting immunity than the killed version. Moreover, it also confers "herd immunity" on the unvaccinated population as well. For several weeks after immunization, the live vaccine replicates in the gut and can be passed on to other people the child comes in contact with, providing indirect immunization.

However, a new and enhanced inactivated vaccine (known as E-IPV for enhanced inactivated polio vaccine) now rivals the live version in effectiveness and, because it is inactivated, cannot cause polio. (Cases could conceivably arise if the virus were improperly killed.) The enhanced vaccine was recently licensed in the United States and is already in use in Europe. Thus the reason for considering a change in course.

The downside of the killed vaccine is that it provides less herd immunity—an important consideration, since in some disadvantaged areas of the country the immunization rate is as low as 50% in contrast to the nationwide average of 95%. Nor are its possible adverse effects known. Although it appears safe, it has not been used in countries where the populations are large enough to reveal a very rare effect.

For these and other reasons, the committee says, a complete switch to the killed vaccine would eliminate the vaccine-related cases but might increase the number of wild polio infections. Thus, they went for a compromise: the killed vaccine, administered at perhaps 2, 4, and 6 months, followed by the live vaccine at 18 months and upon entry to elementary school. This strategy should reduce—but not eliminate—the number of vaccine-related cases and provide the desired herd immunity. It would also ensure an adequate supply of the live vaccine, which is the vaccine of choice in an epidemic.

Even so, the change will bring only a marginal benefit to a remarkably successful program, says the committee. For that reason they recommend waiting until the enhanced killed vaccine is available in combined form, with DPT, which will be both cheaper and easier to administer. And if it becomes clear that the wild virus has been eliminated, then a complete switch to the killed vaccine would be in order. ■ **LESLIE ROBERTS**



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