

Death of a Disease

Within a year smallpox
may have claimed its
last victim

by John H. Douglas

Just five years after he had performed the first successful vaccination, in 1796, Edward Jenner felt confident enough in the new technique to proclaim: "The annihilation of the smallpox, the most dreadful scourge of the human species, must be the result of this practice." This year his prophetic wish may finally come true.

Armed with the sophisticated methods of epidemiology and a modern, freeze-dried version of Jenner's vaccine, the World Health Organization is mounting an all-out campaign against the disease in the last three countries where it remains endemic: Ethiopia, India and Bangladesh. In an interview with *SCIENCE NEWS* at WHO headquarters in Geneva, John S. Copland, administrative officer for the Smallpox Eradication Unit, outlined the plan.

Originally, public health officials had hoped that if more than 80 percent of a population could be vaccinated, smallpox would decline more or less automatically. But in countries like India with relatively large, isolated groups spread over vast areas, the remaining unvaccinated persons served as a po-

tent source for reinfestation. Any attempt to vaccinate 100 percent of such a population would be prohibitively expensive, so WHO officials chose an epidemiological approach, what Copland whimsically calls "'The Bank Robber Theory'—go where the money is." Finding where the payoff is, in this case, involves discovering new outbreaks of smallpox before it has a chance to spread, and cutting off transmission by selective vaccination. First, the victims' families are vaccinated, then their neighbors, then their village . . . until no more cases appear after a period of weeks.

To encourage local help, rewards are offered to the first person in an area who reports an undiscovered outbreak to authorities. In India, rewards now run about 50 to 100 rupees—more than a month's income for many poor villagers—and when an area has been declared free of the disease, even larger rewards are offered, to prevent reinfestation.

Reintroduction usually results from travel between infected and noninfected areas. Between 1961 and 1973, small-

pox was reintroduced into Europe on 29 separate occasions—resulting in 568 documented cases. Air travel complicates the problem, since complete journeys may take place during the incubation period (one to three weeks). Nomadic groups have also been major spreaders of the disease, and in the bandit-ridden mountains of Afghanistan and adjacent areas, outbreaks among smugglers have proved particularly difficult to trace and stamp out.

Another, unique obstacle to final eradication of smallpox is the ancient folk practice of "variolaion"—inoculation with the active variola (smallpox) virus by itinerant medicine men. These untrained peddlers collect pox scabs from victims of the disease and carry them about the countryside in little cases, ready for application to cuts in the skin of persons who have never been infected. The result, of course, is a full-blown case of smallpox, but for some reason these induced cases are less frequently fatal and often do not lead to as much disfigurement. The practice was common in Europe during Jenner's time and prob-



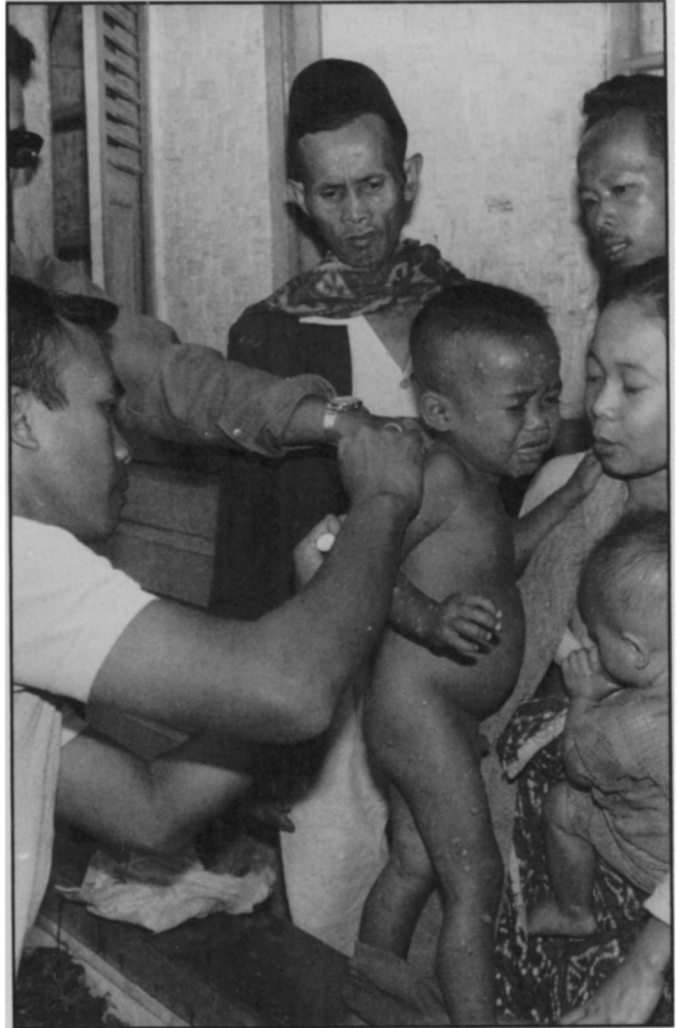
Edward Jenner doing first vaccination.



Medical team meets with nomads, long associated with the spread of smallpox.



India, Bangladesh and Ethiopia are last endemic centers.



WHO helped eradicate smallpox in Indonesia in 1972.

ably gave him the idea for inoculation with material gathered from the lesions of persons with a less virulent disease, cowpox—the process we know as “vaccination.” Under present circumstances, however, variolation amounts only to a frightening possibility of reintroducing smallpox in epidemic proportions once eradication has been completed.

The horror associated with the very mention of smallpox goes back for centuries. Before about 900 A.D. the disease was thought to be a more serious form of measles, and even thereafter it was sometimes confused with the later stages of syphilis. In the 17th century it was epidemic throughout Europe, and its introduction to the New World was a major factor in decimation of the Indians, who had no natural immunity. Throughout the world, people of every class bore the disfiguring scars with which smallpox marked the luckier of its victims; the unlucky developed hemorrhages and gangrene in the patches of coalescing skin eruptions and died in agony. Jenner lived to see the incidence of smallpox reduced drastically in Europe because of his vaccine, but as with many

other viral diseases, no real cure has ever been developed. As recently as 1967, WHO estimated 2.5 million people around the world contracted smallpox annually.

Now new outbreaks are attended one by one, and usually dry WHO progress reports are beginning to read like dispatches from the front lines of an invading army: “Target Zero. . . . The number of pending outbreaks is now only 987 and the total should fall below 800 when returns through end October are received. . . . Bangladesh: Migration induced by famine has resulted in a considerable number of small outbreaks in areas distant from the principally infected regions. . . . It is now a race against time!”

As the goal nears, last minute setbacks take on tragic dimension. Copland tells of a laboratory worker in England who contracted the disease from lab specimens. Weeks passed before doctors arrived at the unexpected diagnosis—time enough for the worker to pass smallpox on to a couple visiting their aging mother in the adjacent bed—both died. Officials began worrying if animals could also cause recur-

rence of the disease by spreading it among themselves and then passing it to humans. Intensive research, however, found that while people can contract “monkey pox” from primates, this is a separate disease and cannot be passed from one person to another.

So all seems ready for the final push. If spreading can be controlled in the three remaining endemic countries by the time incidence usually reaches its annual peak—around March—WHO officials feel confident that they can safely announce the destruction of smallpox. As in other countries, like Brazil and Indonesia, where successful eradication has been declared, a two-year intensive search for new cases must follow—and will probably still find isolated pockets of the disease. If that effort is satisfactory, a specially appointed Assessment Commission will be created to certify eradication.

Sitting in his sixth-floor office looking out at the panorama of snow-covered Alps he calls “the full Wagnerian treatment,” John Copland talks excitedly about the prospects for man’s first total eradication of a disease: “It’s a now or never proposition!” □