The ORIGIN of AIDS

A STARTLING NEW THEORY ATTEMPTS TO ANSWER THE QUESTION 'WAS IT AN ACT OF GOD OR AN ACT OF MAN?'

It was almost thirty years ago, but I clearly remember one event on that hot and humid day early in August 1962. Like communicants in some universal mass, my two brothers, my parents and I slowly moved to the head of a very long, snaking line composed of thousands of people — a significant part of the population of Galveston, Texas. All were awaiting admittance into the central hallway of Ball High School so we could approach a simple wooden table — a kind of altar of science — where a volunteer nurse handed each individual a tiny paper cup containing a sugar cube. I gazed intently at mine. One side had a faint yellow tinge and dark specks where the half-cubic-centimeter or so drop of liquid vaccine had landed.

Though I was surprised that my cube was so dirty looking, I popped it in my mouth, chewed and swallowed. The rest of my family followed suit. Over the next two years, the same ritual was played out in towns and cities across America. These other patient believers, like me and my family, were seeking not life eternal but science's more secular but no less miraculous promise: everlasting immunity from the most dreaded scourge of the Forties and Fifties — paralytic poliomyelitis. Before the polio vaccines were introduced in the Fifties, the disease had struck about 22,000 people a year in the United States alone — often young children. The new, vibrant medium of television showed kids like us shackled by leg braces and crutches or imprisoned in iron lungs — huge cylinders covering all but their heads. I had an even more terrifying image of the ravages of polio: A close friend of my parents', a vital young physician named Martin Schneider, had contracted the disease in 1948 and would spend the last two decades of his life paralyzed from the waist down and confined to a wheelchair.

In one of the greatest triumphs of twentieth-century medicine, the promise to deliver us from that crippling contagion was kept. The one-two punch of the "polio shot" developed by Dr. Jonas Salk and the oral vaccine developed later by Dr. Albert Sabin effectively eradicated polio in developed countries and later in much of the Third World.

But there was a shadow over the conquest of polio. It's estimated that early on, at least, the polio vaccines administered to many millions of people in the U.S. and around the world were inadvertently contaminated. "We took all the precautions that we knew of at the time," Salk says today. "Sometimes you find out things after the fact."

What Salk and the other pioneers of the polio vaccine found out was that accidents did happen. In the preparation of massive amounts of various polio vaccines — either weakened or killed virus that causes recipients to form protective antibodies — things occasionally went horribly wrong. Hundreds of people actually contracted polio by the very means they sought to protect themselves — and some died. Researchers who cultured the virus using the tissues of animals were stricken and sometimes killed by other viruses infecting the animals. And finally, the medium that scientists used to produce the vaccine — the kidneys of swine — caught in the wild — was found to be sometimes contaminated by similar viruses that were later passed on to millions of unsuspecting people.

There is the prospect that we may find something else after the fact: that another polio vaccine may have inadvertently infected its recipients with an even more fearsome and insidious virus, the one that causes acquired immune deficiency syndrome — AIDS.

In August 1991, Elaine Elwood, an articulate AIDS-treatment activist and diligent sleuth of medical literature who works at the University of California at San Francisco, mailed me a tense note paper-clipped to several reproduce items from medical and scientific journals raising the issue. "Here's a bombshell story just waiting for an investigative reporter," he'd said. We'd had a casual, two-year telephone-and-mail ac-

BY TOM CURTIS

ILLUSTRATION BY RODICA PRATO
AN AFRICAN CHILD RECEIVES THE POLO VACCINE IN THE BELGIAN CONGO IN 1957. MOST OF THOSE VACCINATED WERE CHILDREN.
tainted human blood during the entire range of the ma- laria experiments, which ran from 1922 to 1935. Still, AIDS had to start somewhere, so like the other theories, this one has to be considered.

SPLENDID THROUGH THE MEDICAL LITERATURE OF THE last thirty-five years are facts that buttress the unswerving prospect that HIV, the AIDS virus, may have crossed the species barrier as an unintended byproduct of a live-pojos-virus vaccine. There was, in fact, an almost forgotten mass-vaccination campaign in which an oral polio vaccine was administered to at least 325,000 people, and perhaps more than half a million people, in equatorial Africa from 1957 to 1960. One of the two vaccines used in that experimental effort was subsequently reported to have been contaminated with an unknown monkey virus.

The timing seems right. A process called genetic se- quencing, which tracks the evolution of a virus by measur- ing genetic changes, can read the molecular history of a dis- ease. According to Gerald Myers, the federal government's chief expert in genetic sequencing, HIV dates from about 1960, assuming it arose from a single, common ancestor.

There are natural obstacles preventing a virus from crossing the barrier to become established and thrive in a new species. But it happens. And when it does, the virus frequently becomes much deadlier in the new species than it was in the original hosts.

In recent decades, some scientists believe, live-virus vaccines may have actually helped transfer viruses across species lines. Perhaps the classic example is canine parvovirus, or CPV, which abruptly appeared in dogs in 1977 and within months had become a widespread ani- mal epidemic—epidemic on virtually every conti- nent, causing entirely new dog diseases of the intestines and heart muscle. CPV is intriguingly similar in its ge- netic structure to a cat disease called feline panleukopenia virus (PLPV), but it's even more similar to the virus for this disease. This has led several virologists to suggest that by accident or design, the cat virus most likely was introduced into dog cells in the laboratory, where the strain adapted it- self to the new host.

A 1989 article in the Journal of the Royal Society of Medicine noted that case and a num- ber of other cross-species transfers of viruses in the context of AIDS. "It would appear," the piece said, "that the AIDS epidemic may be just one of the latest of the mammalian cross-species viral transfers triggered by the techniques of virology developed in the 20th Century, which subsequently spread out of control in the new host species."

To grasp how this possibility relates to a polio vaccine used in Africa, it helps to know how polio came to be suppressed in most of the world.

"IT'S NOT GOOd TO KNOW TOO MUCH"

In 1954, Jonas Salk, backed by a private philanthropy popularly known as the March of Dimes, introduced the first widely used polio vaccine. His vaccine was a virus-lent form of the polio virus that had been killed by formaldehyde. This, or "inacti- vated," virus was injected into people to pro- voke the body's immune system to manufac- ture disease-fighting antibodies that would repel the wild, paralyzing types of polio. But medical science ultimately rejected Salk's shots as the vaccine of choice in favor of a weakened but still living virus administered by mouth—in Albert Sabin's sugar cube. Unlike the Salk shots, which were be- lieved to require periodic booster vaccinations, the oral polio vaccine conferred lifetime immunity. It could be taken by mouth and required no injections; and the live vaccine silently spread the weakened, non-paralyzing vi- rus even to those who failed to take the oral vaccine. Those "susceptibles" would simply catch the weakened virus and get the infection without noticeable symptoms. They also would become immune to paralytic polio.

Polio vaccines are produced by selecting weakened strains of polio virus and then placing them in tissue cul- tures—live cells from primates. (Either monkeys or hu- man cells will work, but researchers selected monkeys be- cause their tissue was more available and there were fears that human cells might spread cancer. The uncon- considered danger, though, was this: Because monkeys are ge- netically similar to human beings, some simian viruses can leap the species barrier with devastating effect.) The

TOM CURTIS, a former senior editor at 'Texas Monthly', is a freelance writer based in Houston.

56 • ROLLING STONE, MARCH 19TH, 1992
The ORIGIN of AIDS

The virus then enters the cell and reproduces itself. All the polio viruses grown to produce the mumps vaccines in the Fifties were fed one particularly nourishing medium: fresh monkey kidneys. And throughout the Fifties—a period that was barely the dawn of the scientific knowledge regarding tissue culture—some of those monkey kidneys were infected with numerous monkey viruses. Scientists knew about some of these viruses and developed tests to identify and then eliminate the viruses that contained them.

One of the earliest and deadliest was the so-called monkey B virus—a herpes virus first identified and isolated in 1932 by Sabin after it killed a medical colleague at New York's Bellevue Hospital. The unfortunate polio researcher had been bitten by a monkey. "He developed paralysis after the monkey bite," Sabin recalls. That same year, Sabin himself was shot in the head by a drunkard. "Sometimes it's not good to know too much.

While working at the Lister Institute in England, in 1934, Sabin was able to prove that what he had found was a distinct virus. And in 1959, when he was working in Cincinnati, Ohio, he again isolated the virus after another physician researcher was killed by it.

"In monkeys, it's a disease which is as mild as ordinary fever blisters are in human beings," Sabin says, but in humans it paralyzes and kills. "As a result of that, all the [researchers] monkeys had to be tested." Special precautions were instituted. "But sometimes they were not used," Sabin says.

Deaths from monkey B virus, though infrequent, have continued, the latest a veterinarian at a South Texas primate facility who died of monkey B virus last fall.

THE FORTIETH MONKEY VIRUS

So monkey B was kept out of the polio vaccines. But there was another monkey virus that polio researchers missed. Between 1954 and 1963, an estimated 10 million to 30 million Americans and scores of millions of people around the world were exposed to a virus that infected the kidneys of Asian rhesus monkeys imported into India. The virus survived the formaldehyde that Salk used to kill his polio viruses. Since 1961, researchers have detected monkey M for SV40—so called because it was the fourth such monkey virus identified—before using their kidneys for vaccine production.

SV40 was delivered straight into people's bloodstream along with their Salk shots and via sugar cubes in field trials of the weakened live virus developed by Sabin. Though it was later shown to cause cancer in hamsters and to "immortalize" human cells in test tubes—thus predisposing these cells to cancer—SV40 has not been proven to generate illness in human beings. Nevertheless, researchers at Johns Hopkins recently discovered that when they injected cells treated with SV40 into nude mice, which lack an immune system, the mice developed Kaposis sarcoma-like tumors, similar to those affecting many AIDS victims. Remarkably, considering the large numbers of people who received the SV40-contaminated polio vaccines, no one has conducted a major epidemiological study in the U.S. to discover whether there is any pattern of illnesses caused by the virus.

Still, there are some troubling statistical associations. In 1968 a scientist in Australia described a correlation between polio immunization and cancers in children past one year of age. Much later, German scientists found evidence that SV40 in 30 out of 110 brain tumors, and later reports indicated a jump in the frequency of brain tumors among those who had received vaccine contaminated with SV40. And SV40 has been associated with other human cancers as well.

After news broke about the monkey virus SV40 contaminating some lots of Salk's and Sabin's polio vaccines, congressional hearings were called to examine the explosive issue. On April 14th, 1961, a rival polio researcher of Salk's and Sabin's sent a letter to the House Health and Safety Subcommittee taking issue with growing live-polio-virus vaccine in monkey kidneys.

Dr. Albert Sabin, whose vaccine helped eradicate polio, pictured in 1963.

Sounding like someone who had come to his understanding through hard experience, the researcher—Dr. Hilary Koprowski of Philadelphia's Wistar Institute—suggested that human cell lines be used instead. "As monkey kidney culture is host to innumerable simian viruses, the number found varying in relation to the amount of work expended to find them, the problem presented to the manufacturer is considerable, if not insuperable." Koprowski wrote the committee. "As our technical methods improve we may find fewer and fewer lots of vaccine which can be called free from simian virus."

But when Koprowski, Salk and Sabin were doing their initial vaccine development in the Fifties, little was known about the simian viruses, and there were no federal regulations stipulating that the viruses be grown in a specific type of tissue culture. No one knew then about retroviruses like HIV that might take years to develop, and so it was assumed that if no viruses had shown up in preparations after a couple of weeks, then those vaccines were clean.

In 1967, researchers in the Washington, D.C., area reexamined an earlier study run between 1959 and 1965 on nearly 59,000 pregnant women, they found a startling correlation: The incidence of brain tumors in children of mothers who'd been injected with the Salk vaccine was thirteen times greater than that of offspring of mothers who hadn't had those polio shots. Stored blood serum from these mothers still existed, and it was retested. The tests seemed to exclude SV40 as the cause. But if not SV40, what about the Salk vaccine might explain the increased risk of brain tumors in the offspring of vaccinated women? The researchers asserted that some other infection was probably the culprit. After all, they noted, the Salk vaccine was known to have been contaminated with numerous monkey viruses.

THE MARBURG MONKEY VIRUS

In mid-August 1967, six years after the SV40 problem came to light, a mysterious, dangerous, infectious disease broke out simultaneously in German and Yugoslavian research institutes. Thirty-one people, including technicians making polio vaccines, suddenly became ill—and seven died. All those infected had direct contact with monkey kidneys or their blood, organs or tissue cultures. Other people later got the disease, too, including hospital personnel who had contact with these patients. In one case, a woman contracted the disease from the semen of her husband, who had been infected three months earlier. Though millions of monkeys had been used as experimental animals and as raw material to provide kidneys to make vaccines, no such disease had ever been seen before. Eventually the "Marburg virus" was isolated, and its source was traced to monkeys shipped from Uganda.

But if HIV were one of those numerous monkey viruses contaminating the early Salk and Sabin vaccines, presumably there would have been an explosion of AIDS in the U.S. outside the currently defined high-risk groups: male homosexuals, IV drug users, hemophiliacs and the sexual partners of those people. Of course, that sort of eruption hasn't happened in the U.S. But it did happen somewhere else: in equatorial Africa.

THE CONGO VACCINE

As it happens, equatorial Africa was the site of the world's first mass trials of an oral polio vaccine—a vaccine cultured in monkey kidneys but different in at least one important respect from the Sabin vaccine ultimately adopted worldwide. This footnote in medical history took place from 1957 to 1960 right in the middle of what was then the Belgian Congo, Rwanda and Burundi—the epicenter of the future African AIDS epidemic. It was developed by a naturalized American polio researcher
named Hilary Koprowski — the same Dr. Koprowski who four years later would warn congressmen of the dangers of an almost infinite number of monkey viruses contaminating polio vaccines.

Hilary Koprowski, the developer of the vaccines used in the Congo, was a charming, deep-voiced man of seventy-five. Born and educated in Poland, where he studied to be a concert pianist while going to medical school, Koprowski began work for Lederle Laboratories in 1946. Like Salk and Sabin he took up the cause of saving the world from polio. He tested weakened strains of the virus in monkeys and chimps and in March 1951 surprised a meeting of polio researchers sponsored by the March of Dimes in Hershey, Pennsylvania. There he revealed that he had become the first physician in history to administer a polio vaccine to humans. The "victims" research subjects for Koprowski's live, weakened polio vaccine included twenty children he later described as "mentally deficient" who lived in Leesport Village, a facility operated by the New York State Department of Mental Health. Later he vaccinated other groups of children, among them the newborn babies of institutionalized women in New Jersey. But a larger test of the vaccine, planned for children of Belfast, Northern Ireland, in 1956, was scrapped amid reports that some of his turned oral vaccine had reverted to its wild, paralytic form. While no one was paralyzed and Koprowski insists that no one ever would have been, authorities in Belfast feared that such a "reversion to neurovirulence," to use the medical jargon, might spark a new polio epidemic.

After the Belfast debacle, Koprowski, who was facing Sabin for the distinction of producing the oral polio vaccine of choice, left Lederle Laboratories to direct Philadelphia's Water Institute, then a modest research organization best known for developing a unique laboratory rat. But he held tightly to his goal of producing the winning polio vaccine.

Almost immediately, Koprowski arranged to have his weakened polio viruses tested in a colony of 150 chimpanzees in Camp Lindi at Stanleyville, in the Belgian Congo (now Kinshasa), Zaire. To protect the animals' caretakers, these humans, too, were fed the weakened virus. The successful immunization of the keepers then became the justification for mass vaccination trials in the Congo itself — the first mass trials in the history of an oral polio vaccine. Called by drum, rural Africans traveled to village assembly points. There they lined up and had a liquid vaccine squirted into their mouths. Using this spray method, nearly a quarter million Africans were inoculated in six weeks. Later another 75,000 or so children in Leopoldville, now Kinshasa, got the vaccine, too — though European children living there apparently received their vaccine in capsule form, possibly a significant variation.

From the beginning, Koprowski's campaign was marked by controversy. "Told by Fary, Aaron Klein's 1977 account of the development of the polio vaccines, reports that Koprowski apparently claimed he had the backing of the World Health Organization, but WHO denied sanctioning the mass trial. Koprowski says today that although he was challenged by WHO, he needed only the approval of the Belgian authorities — and there's no doubt he had that. Other preparations of Koprowski's polio vaccines were later used in Poland, Yugoslavia and Switzerland, among other places."

Herald Cox, Koprowski's superior at Lederle, had begun growing the polio virus in developing embryos in chicken eggs. Early on, Koprowski also used the brains of cotton rats to select his weakened strains and nurture the virus. But by 1956 and 1957, when he was making his vaccine for use in the Congo, Koprowski had long since switched to minced-up monkey kidneys.

Monkey kidneys contained innumerable monkey viruses. Might the one that causes AIDS be one of them? And if it were, would Koprowski's method of delivery — shooting the liquid into people's mouths — be capable of transferring the virus from monkeys to humans?

"You can't hang Koprowski with that," Albert Sabin growls at me. He's sitting at the desk in his study; the senior president, Sabin insists that the AIDS virus won't survive swallowing. He's certain of it. But whether it does or doesn't survive is really not so clear-cut, Dr. Robert Gallo and other retrovirus researchers acknowledged to me; no one knows for sure. Moreover, Gallo's colleague, Dr. William Haseltine of Harvard and also of the Dana-Farber Cancer Institute, in Boston, and others have reported that the AIDS virus infects mucous cells — which of course occur in the mouth as well as in the genitals.

And Dr. Robert Bahnson of Baylor College of Medicine, in Houston — who in November 1991 reported finding a monkey retrovirus in the tumor of an AIDS patient with no known contact with monkeys — pointed out to me that the process of squiring the polio vaccine in people's mouths would tend to send tiny drops into the air. It might go directly to the lungs or nose and thence to the blood cells it is known to infect.

Later I pose the same question — Could squirting an HIV-laden polio vaccine into people's mouths cause AIDS? — to Dr. Tom Folks, the chief retrovirologist at the Centers for Disease Control, in Atlanta. "Sure it could," he says. "Any time a person has a lesion in his mouth, then there could be transmission if you put enough of the virus in.

MONKEY AIDS

But was there anything to transmit? The answer to that question hinges on the kind of monkeys used to make Koprowski's vaccine.

In 1957, when the Congo trials began, most researchers were using rhesus macaques from India. It would be another four years before scientists fully appreciated the danger that macaques, the natural hosts for SV40, were passing along the virus to humans. Once that troubling discovery was made, in 1951, vaccine producers shifted to kidneys from African green monkeys, which in the wild were free of SV40.

Unfortunately, green monkeys were infected with something else. More than two decades later, in 1982 and 1983, veterinarians at the California Primate Research Center and as Harvard's New England Primate Center observed that large numbers of their macaques were dying periodically of AIDS-like illnesses. These disorders had been killing animals since 1969, but suddenly, the researchers were struck by the similarity to the new disease affecting American homosexual men. The monkeys' illnesses, the researchers discovered, were triggered by a previously unrecognized retrovirus called simian immunodeficiency virus (SIV).

Among the natural hosts for this virus were none other than African green monkeys, but in that species, typically, SIV didn't cause serious disease. SIV turned out to be related to HIV, though it was only about forty percent similar in genetic structure to the chief AIDS-causing human retrovirus, known as HIV-1. Robert Gallo says some versions of this monkey virus are virtually indistinguishable from some human variants of HIV-2, the second virus that causes AIDS in human beings and mainly affects western Africa.

No one who was involved with Koprowski's Congo project and is alive today remembers what kind of monkey kidneys were used in 1957-60. Koprowski is still vigorous and remains at the Wistar Institute, in Philadelphia — now as an institute professor and until 1991 as the director of the facility, which is housed in a superb Victorian structure on the campus of the University of Pennsylvania.

Koprowski insists that his associates used kidneys from African green monkeys to make the Congo vaccine. When I express surprise and mention that Salk and Sabin were using rhesus monkeys at that point, he agrees to check. When we speak next, he admits he can't find a single paper describing which species was used to make his vaccine. "But I have a suspicion the virus was grown in the rhesus monkey at the original beginning," he tells me in his thick Polish accent. "Now when we switched to green monkeys, I have no idea." Thomas Norton, his associate who grew the virus for the vaccine, is now dead, Koprowski says — as are those who worked with Norton to
prepare the vaccine. Significantly, the large loss of the vaccine used in the Congo apparently were prepared at the laboratories of the Wistar Institute, it says. Wyeth Laboratories made subsequent preparations, including those used in Poland.

**CONTAMINATION?**

The question of which monkeys were used to make the Congo vaccine may not be crucial. The virus that causes monkey AIDS occurs in several species, though the original hosts — African greens and others — remain healthy even when infected. Monkeys frequently were gang-ganged in those days, facilitating the spread of viruses. If a green monkey turned out to have a virus quite similar to HIV-1, it could have infected the other monkeys.

Although most American researchers in this period apparently did use rhesus macaque monkeys from Asia, for a while around the time Koprowski was working with his vaccine, the monkey supply was interrupted. The Indian government — responding to popular alarm among its people about the widespread slaughter of Indian macaques for vaccine production and other research — barred export of rhesus monkeys to the U.S. For a time at least, that ban must have made suppliers scramble to find different markets and alternate monkey species, probably including African monkeys. Moreover, Koprowski says the kidneys used at Wistar were bought already removed from their hosts, meaning that researchers might not have been sure what kind of monkeys they came from, much less what viruses came with them.

According to no less an authority than Albert Sabin himself, at least one other virus did contaminate Koprowski's vaccine used in the Congo. In 1999, Sabin reported in the *British Medical Journal* that a special test he had devised revealed the presence of an "unidentified" cell-killing virus in "Koprowski's type 1 'Chat' vaccine used in the Belgian Congo trials." More than three decades later, Sabin says he never figured out exactly what the virus was.

Koprowski insists — as he did at the time in the *British Medical Journal* — that two other labs examined his vaccine and found nothing except the weakened polio virus. But one eminent polio researcher, Dr. Joseph Melnick, former chairman of the Department of Virology at Baylor College of Medicine, in Houston, who himself developed an oral polio vaccine while working at Yale Medical School, says Sabin probably was right. Sabin was a very careful worker in the laboratory," Melnick says, he would have known if there were other viruses present. "I have not known him ever to say that he has found a virus in some preparation that did not exist in that preparation.

In any event, Melnick says, "Monkeys

1932: Young Albert B. Sabin identifies and isolates a monkey virus that has killed a polo researcher at Bellevue Hospital, in New York. It is later named monkey B virus.

1946: Hilary Koprowski and his superior at Lederle Laboratories, in Pearl River, New York, begin work on the polo-virus vaccine.

1950: Koprowski tests first polo vaccine on humans — a live oral vaccine. The virus is grown in chicken eggs and passed through rat brains.

1954: Jonas Salk introduces his killed polo vaccine, made from virus grown in monkey kidneys.

1955: India, reacting to the widespread slaughter of monkeys to make vaccines, restricts exports of rhesus macaques.

1956: Salk begins testing a live polo vaccine on humans.

1957: Koprowski's vaccine, now grown in monkey kidneys, becomes the first oral polo vaccine to be tried on a large population — in the Belgian Congo. More than 240,000 are vaccinated in the first six weeks, most in the remote eastern part of the country.

1957: Sabin begins field trials of his vaccine in the Ivory Coast. Later, upward of 70 million get it there.

1958: A three-year campaign to vaccinate African children in Leopoldville (now Kinshasa, Zaire) begins. Some 75,000 children will receive Sabin's vaccine.

1959: Nationalists rise up in Leopoldville.

1959: The first detection of HIV in Leopoldville, according to two standard blood tests of stored blood conducted in 1986.

1959: Sabin reports that an unidentified monkey virus contaminates Koprowski's Congo vaccine.

1960: Independence and civil war come to the Congo; Belgian workers depart. At least 125,000 Congolese, maybe many more, have been inoculated. No long-term follow-up is done.

1960s: First case of HIV, according to a rough estimate based on genetic sequencing calculations by Gerald Myers of Los Alamos National Laboratory, in New Mexico. 1961: Fashions of Salk and Sabin vaccine given to millions worldwide are reported to have been contaminated with SV40, a monkey virus that causes cancer in hamsters.

1961: French-speaking Haitian stream into the former Belgian Congo to take over jobs previously held by Belgian colonials.

1961-62: Sabin vaccine is licensed in the U.S. and becomes vaccine of choice. Koprowski's is frozen out.

1962: Several more AIDS cases originate in Zaire in this year and later, according to subsequent testing. Some scientists believe that AIDS radiates outward in Africa from Zaire.

1967: Marburg monkey virus kills polo researchers in Germany and Yugoslavia.


1982: An AIDS-like disease is identified as killing monkeys at California and Massachusetts primate centers; a virus is later isolated as the culprit. The consents, it turns out, have been wiping out captive monkeys since 1969.


1985: Researchers report finding HIV among remote villagers in the Kaga District, in eastern Zaire.

1987: "Missing link" chimps found with closest thing yet to the human AIDS virus.

1991: Some strains of simian immunodeficiency virus (SIV) are found to be almost identical to HIV-2, the form of AIDS plaguing West Africa. This boosts speculation that a monkey with a virus quite close to HIV-1 eventually will be found.

1991 (December): Researchers Robert C. Bozanne requests samples of Koprowski's Salk's and Sabin's seed stocks to check for contaminating monkey viruses. No response to date from Koprowski; limited success with the Food and Drug Administration. — T.C.
have been the vector that unwittingly first unleashed the AIDS virus among people in Africa? I ask the question and Koprowski dismisses the idea with a deep laugh. "Ha, ha, ho, ho, ho." I'm asking the question, I say.

He laughs again, this time longer and deeper. "By then you would have had plenty of opportunity to see AIDS in the vaccine," Koprowski says. "You have started in 1960; now it's thirty years. The latency period of AIDS is nine years."

But according to Dr. Gallo, I point out, some retroviruses may take up to forty years to express themselves.

"There is no indication from any part of the world that any other virus occurring there (in the various polio vaccines) causes any problem," Koprowski says.

There are reasons, however, why AIDS in the former Belgian Congo may have been invisible to medical science. In remote, rural eastern Zaire, where most of Koprowski's colleagues vaccinated the lion's share of their reported sample - 215,504 children and adults, and there may have been many more vaccinations than initially reported. "Could have been 200,000 more, I really don't know," Koprowski says, because the authorities there were intimidated by tribal chaos and the civil war that followed independence. No one really knows how those individuals fared over time.

As for the report Koprowski's colleagues sent on the question of follow-up immunizations in Zaire, it was not possible, he says.

The researchers who studied the Zaire District in 1980 offered several possible explanations for why people who found with antibodies for the AIDS virus might not have the disease. The fact that there were more children than adults with antibodies to the virus suggested that the adults could have been exposed in childhood, and some of them might have died or departed from the area. Perhaps, the researchers ventured, if members of a rural population that was biologically adapted to the virus moved into an urban area, exposing a pool of more susceptible adults, this would create "new opportunities for the virus to cause illness in urban adults and the epidemic appearance of the disease in Africa." Moreover, the researchers pointed out that the 1960-1962 "substantial mortality in childhood, particularly from infectious diseases." Cases of AIDS in children a generation ago simply might have gone undetected.

Of course, many of the viruses contaminating the monkeys' kidneys were unrecognised in the Fifties and early Sixties. Koprowski and his colleagues in the mass-vaccine campaigns found some monkey viruses and eliminated them from their preparations. But many others weren't known, and no test to identify their presence had been developed.

"That's the problem," Koprowski says. "The viruses which you know, there's a test -- there's no problem; the viruses which luck, for which there is no test, obviously you can't do anything about."

So, maybe Koprowski's Congolese vaccine... Later, Koprowski describes for me how the kidneys' immune response had been mimicked using "scissors or something like that." He is quite correct that HIV and its monkey counterpart, SIV, do not appear to grow in the kidney cells. Instead, as he points out, these viruses are known to grow in lymphocytes and macrophages - cells found in the blood. But this doesn't mean that under the right conditions a polio vaccine grown in monkey kidney cultures might not harbor an AIDS virus.

I raise this issue with Tom Folks, chief of the retrovirus laboratory at the Centers for Disease Control, in Atlanta. "You see, the problem with the kidney," says Folks, "is that there's blood and there are lymphocytes that would be contaminating the tissue. So, no matter how hard you try to mince it up -- and I've made monkey kidney tissue cultures many a time -- you can't get rid of the lymphocytes. So, if the monkey that it's derived from has a pretty fulminating SIV infection, and then they were placing polio (virus) on top of the monkey kidney, but there were contaminated lymphocytes, that is going to be part of the stock. Yeah, it would be there.

"It's not surprising at all," Folks continues. "And the fact that it's a line vaccine would indicate that they had not gone through any inactivation procedures to denature the AIDS virus, because it would probably denature the polio virus. So, the polio virus is kept alive, and the SIV virus would just travel with it."

The ultimate way to test the idea, Folks agrees, would be to return to the original seed stocks of the vaccine and actually test the retrovirus, if any, from the polio vaccine. Does Folks think there is value in figuring out where AIDS came from? "I think anyone we can learn more about the natural history, it helps us understand the pathogenesis [how the disease process works], and it helps us understand the transmissions," he says. "It's a delicate issue. You're going to put some people on the spot -- the person who has the stocks."

Koprowski's uncanny - like Dr. David Heymann, who heads the office of research for the World Health Organization's Global Programme on AIDS, and Harvard pathologist Paul Offit, who are so much the possibility that a vaccine could have introduced AIDS that they refuse to discuss it. "The origin of the AIDS virus is of no importance to medical science today," Heymann says in a phone interview from Geneva. "Any speculation on how it arose is of no importance."

Baseline is even more unanswerable. "It's intriguing, it's provocative, it's confusing to the public, and I think it's grossly misleading in terms of getting to the solution of the problem," he says. "It's over, it's done with, it's very, very, very unlikely it happened that way, (Cont. on 108)"
Origin of AIDS

[Cont. from 106] and it's another nonsense article. It's the worst kind of reporting, as far as I'm concerned.

But you haven't even heard anything about it, I say.

"I know what that theory is," Hazelton says.

"Yes, I know, but what do you think about it?" I ask.

"I think it's not a theory," Hazelton says. "It's a fact.

"Are you sure?" I ask.

"I'm sure," Hazelton says. "I've read the evidence."