

### An Exclusive Profile/Interview of Dr. Donald A. Henderson, Dean of the Johns Hopkins University School of Hygiene and Public Health

By BLAINE TAYLOR

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#### Enter the Dean

The date was Sept. 7, 1977. The speaker was Richard S. Ross, MD, Dean of the Johns Hopkins School of Medicine, and he was giving a symposium introduction of one of his colleagues, Dr. Donald Ainslie Henderson, who, he stated, "Is the Dean of the Johns Hopkins University School of Hygiene and Public Health. He is a physician who has spent his life in preventive medicine. He has to his credit one of the greatest accomplishments in preventive medicine of our time, that of the almost complete eradication of smallpox in the world. I have asked him to speak to the entering medical students because I believe preventive medicine and public health to be very important parts of medicine in the broadest sense. If we are going to find long-term solutions to our problems, we need to know more about epidemiology, biostatistics, clinical trials and prevention. I am anxious to develop closer ties between the School of Medicine and the School of Hygiene, and Dr. Henderson and I will be working closely toward that goal. I have asked him to tell you something of the topics that are of interest to him and his associates in public health. In time, you may take

advantage of the proximity of the School of Hygiene to the School of Medicine and may choose an elective course there. Ultimately, some of you may enter a career in public health."<sup>1</sup>

Dr. Henderson—6'2" in height and weighing 180 pounds—had been born exactly 49 years earlier on that date in Lakewood, OH. A shy, boyish-looking man given easily to hearty laughter, he had earlier succeeded Dr. John C. Hume as Dean on Feb. 1, 1977 after the former had served a decade in that post. Dr. Hume described his successor as "A highly intelligent man with broad experience, vast energy and a very deep commitment to public health and preventive medicine."<sup>2</sup>

The man universally called "D.A." by his friends and associates (and rumored to soon be nominated for a Nobel Peace Prize for his work in smallpox eradication), graduated with an AB degree from Oberlin College in Ohio in 1950, and married the former Nana Irene Bragg the following year.

In 1954, the year of the birth of the first of the couple's three children, he graduated from the University of Rochester School of Medicine in New York (from which University he received an honorary ScD 23 years later), and in 1960 (the year their last child was born), Dr. Henderson received his Master of Public Health degree from the School of Hygiene and Public Health he would later head—Johns Hopkins.

His other honorary degrees include ScDs from the University of Illinois and Oberlin College (both in 1979), and an LLD from Marietta College (1978).

During 1954-55, Dr. Henderson performed his Internship (and, during 1957-59, a Residency) in medicine at Mary Imogene Bassett Hospital at Cooperstown, NY. In the decade of 1956-66, he served in various top capacities in epidemiology at the Communicable Disease Center (CDC) of the US Department of Health, Education and Welfare (HEW) at Atlanta, GA, where he was also an Assistant Professor of Preventive Medicine and Community Health at the Emory University School of Medicine.

The year 1966 saw Dr. Henderson appointed as World Health Organization Chief Medical Officer for Smallpox Eradication, and his 1977 Hopkins appointment included a post as Professor of Health Services Administration as well.

A member of numerous professional societies (the American Public Health Association, the American Epidemiological Society, the American Board of Preventive Medicine, the International Epidemiological



DR. HENDERSON

Association, the Indian Society for Malaria and Other Communicable Diseases, the Royal Society of Tropical Medicine and Hygiene, the New York Academy of Sciences, the American College of Preventive Medicine, the American Association for World Health, the Institute of Medicine of the National Academy of Sciences and the Association of Schools of Public Health), Dr. Henderson has delivered scientific lectures in the US, Canada, Great Britain, Switzerland and elsewhere.

Since 1978, he has been a member of the Boards of Directors of Esperanca, the International Agency for the Prevention of Blindness and the Maryland Society for Medical Research, Inc., and has biographical listings in **Who's Who in America**, **American Men and Women in Science** and the **Dictionary of International Biography**.

His work has earned him over a dozen major awards and medals from the US, Britain, West Germany, India, Pakistan, and Afghanistan, as well as the 1976 Special Albert Lasker Public Health Service Award given to the WHO for the Smallpox Eradication campaign.

Dr. Henderson has published many articles on his work, including **The Eradication of Smallpox** (in **Scientific American**, October, 1976) and **Smallpox—Epitaph for a Killer** (in **National Geographic**, December, 1978).

To ask him to describe the successful smallpox program in his own words—as well as to learn of the Dean's hopes for his newer post—this writer visited Dr. Henderson in his headquarters in Room 1041 on the first floor of the Ernest Lyman Stebbins Building in East Baltimore. Green, red and blue ink pens were on the table in the panelled room as we discussed at length his past, present and future.

I commented upon the view from the Dean's office when we met there for the **Journal** interview on Dec. 27, 1979, and Dr. Henderson responded that it was nothing compared to his view of the French Alps from his previous office in Geneva, Switzerland. This lead-in began our talk, which follows.



**THE DEAN** (right) with Med-Chi member Dr. Edyth Schoenrich in 1977. (Journal file photo.)

## Origin of Smallpox Eradication Program

That was when I was Chief Medical officer of Smallpox Eradication. As such, I was responsible for the coordination and direction of the global program.

### How did you get into that originally?

It goes back to the early 1960s, when I was working at the Center for Disease Control (CDC) in Atlanta, GA in a number of programs relating to immunization: polio, measles, etc. We had an interest in developing various devices which we hoped would facilitate vaccination, and cooperated there with the US Army in the development of the jet injector adaptation, which would permit intercutaneous application of smallpox vaccine. We next were involved with the Agency for International Development (AID) in a program of measles vaccination, which they were giving in 11 countries in West Africa. We felt that this wasn't very sound, technically, for the simple reason that most children have measles before the age of three—and—when you complete a mass campaign **one** year—you're back to zero three years from then. All the children are again going to be developing measles, unless you continue the program, which they weren't planning to do.

We indicated that we'd be willing to cooperate with them in a program, if we could do something that would have a lasting impact, and that would be to add smallpox eradication through a 20-country area. They accepted this, after some debate, because it was a very expensive program for them, but not so in the health field. We began in November, 1965, and this provided an impetus to the World Health Assembly to undertake an intensified global smallpox eradication program, which had been decided on back in 1958, but which had made little progress.

In May, 1966, the WHA passed a resolution saying that we should finish this program in 10 years. At that point, the Director General talked to the US Surgeon General and said that I was the person to head it up. I was asked to go to Geneva and take over the program.

We were there 11 years.

### Did your wife and family like it there?

They loved it, and thought it was marvelous! To really administer a program, however, you have to be out **seeing** what's happening and getting feedback from those concerned in the work, so I was spending 65-70% of my time out of Geneva—two-three weeks out in the field, and one back and so on. This went on steadily, and I must say that I saw more airport terminals and had more miserable airline flights than one can possibly imagine! I still have no desire to travel!

This is what I did for 11 years, although I didn't expect to **be** there that long. At the beginning of the program, there was a great deal of skepticism that smallpox **could** be eradicated and real doubt that the WHO would exhibit the leadership necessary to undertake the program.

I was strongly advised by a number of colleagues not to get involved with it, and, in fact, only expected to be there about one-two years to get it underway—and then return home.

## The Program's Longevity

**Why do you think it stretched itself out as long as it did?**

Why did I stretch myself out as long as I did is the question! (laughing.) The program was intended for 10 years—that was the goal, to have the last case **before** Dec. 31, 1976. We missed the goal by just under 10 months.

As we began working, it was clear that we were beginning to make more progress than we thought we would initially—this was just in the first couple of years, but, then, as time went on, it was clear that there were many implications for the future in a lot of other activities.

The program **was** going well, and we certainly got caught up in it, had a lot of colleagues from around the world and there was a great deal of excitement, particularly as we got on toward 1974, when we—for the first time—felt confident we were approaching zero. We just kept on going after that.

**Why was the figure of 10 years set initially? Is that how long they thought it would take?**

That's the marvelous thing about a planning process! If you remember, at that time, President Kennedy had said we'd land a man on the Moon in 10 years, so we decided to do the same thing with smallpox eradication. **That** was purely and simply it.

### Program Location

**Was it primarily Africa where you were working?**

No—Africa, Asia **and** Latin America. There were 50 countries in all, eventually, involved in the program.

### The Communist Bloc Role

**How did the Communist Bloc countries cooperate?**

The Soviet Union, in particular, was of great help. In a way, it was kind of an ironic situation, as the primary supporters of the program were the US and the USSR and Sweden. Back in '58, the Soviet Union had proposed to the World Health Assembly that they undertake global eradication, and pressed it very strongly. It was decided that it **would** be done. The Soviet Union had a very long land border which it shared at that time with many endemic countries, so that there were a lot of smallpox importations into the Soviet Union. Not much happened, as I said, until January, 1967, but the USSR continued to provide strong support so that, in the first four-five years of the intensified program, they were providing something like 140 million doses of vaccine a year. As time went on, that figure diminished, but we also got good personnel support from Czechoslovakia, Poland and others, so that it really was an international group involved with this.

**Did you go to the Soviet Union?**

Yes, I visited there several times to talk with the Minister of Health about getting more vaccine and personnel.

### Personnel

**How many people did you have working with you directly worldwide?**

In Geneva, it was a small staff: four medical officers (including myself), two administrative officers and three secretaries. In the field, we had WHO staff—



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such as from the US—one or two, and sometimes as many as four or five, in each of the countries: about 50-100 people, initially, in the field. Later, toward the end, as we got into the intensified phase, we got up to about 100-150 in the last 10 infected countries.

Obviously, the WHO staff wasn't doing the job—the **countries** were. We were serving a catalytic function: planning, helping them to organize, working out strategies, etc. If you take in the various **national** staffs, therefore, it ran to as high as 150,000 people worldwide at various points in time.

### His Role

**Would you describe your own role in all of this as one of coordination?**

That's right. From soliciting vaccine and funds for the program, to working out the different diplomatic problems which we inevitably had trying to get all these countries to participate and cooperate; recruiting and training people, developing manuals, working on the research side of it and such. It was a lot to be done!

### Diplomacy

**On the diplomatic end—during the US involvement in Vietnam and the various "brushfire wars" in Africa—how much of a pawn, caught between these things, was the program?**

The program was involved, on many occasions, in countries where there was civil war and active fighting going on. What was surprising was that the program itself was amazingly non-political, that is to say that there was a positive side to this. We got help in situations where we didn't expect it. In Nigeria, for instance, a civil war began very soon after the program itself did, when Biafra broke away. For a period of time, the national government actually carried vaccine to a bridge, retreated and let the Biafrans pick it up. Then the International Red Cross continued to provide food and medical supplies when this ended, and so the program continued on **both** sides of the fighting. Information was also exchanged back and forth.

In the Somali/Ethiopia War, Somalia invaded Ethiopia **while** we were working there! In one case, the guerrillas were about to take over a particular town. One of the four helicopters we had in Ethiopia landed in the town and the people informed them that the town would be taken after they took off. As they did so, the people in the helicopter could see the gunfire in the town as the guerillas came in.

### Under Fire

**Were you ever under fire yourself?**

Yes (laughing softly), a couple of times I was shot at, but I wasn't at risk as much as others in the field, and we **did** have WHO staff kidnapped by Somali guerrillas and held for from a week to a month in some cases. The guerrillas asked for ransom, but this was always refused. Ultimately, the guerrillas would get the message that we were non-political, medical people combatting something that affected **both** sides, and they'd let our staff go.

We had two Ethiopian staffers shot and killed, and one team blown up by a land mine explosion in Yemen, plus various accidents, but the fatality rate was low,

considering the many risks we ran. **None** of our international staff was ever killed.

### Eradication a Reality?

Can you *really* eradicate anything—or aren't we going to see a smallpox case five years from now? Every once and awhile, for instance, there'll be a case of, say, **Bubonic Plague** somewhere.

We can't ever specifically identify a disease that has been eradicated previously. During the Middle Ages, there was a peculiar disease known as the sweating sickness which swept Europe and disappeared. It occurred at a time when the description of medical illnesses was rather poor, and nobody's really quite sure whether it was a disease that disappeared or is still prevalent.

Never before has man set out to eradicate a disease and succeeded. I think, conceptually, it's difficult for many people—including physicians—to quite appreciate that a disease **is** gone. The best way to understand this situation today is to say that—at this point—we believe that smallpox virus is confined to glass ampules in seven laboratories—and **that's** it, nowhere else in the world. It's not likely to appear again, unless it escapes from a laboratory, or unless, remotely, there's an animal reservoir which we don't know about.

For 10 years, now, we've been looking for such an animal reservoir, because there **was** one in the case of Yellow Fever. They **thought** they were going to be able to eradicate that until an animal reservoir of Yellow Fever was found. At one time, it was felt that Yellow Fever was present only in humans, but then it was found to infect forest mammals, so you couldn't eradicate it. It kept coming back.

Another such example was malaria, which is also found in monkeys infected with the same kind of parasite.

With smallpox, therefore, we were really wondering from the very beginning. From 1967, a great number of studies were done trying to find just such a reservoir. The best evidence that there **is** none is that, after smallpox was eliminated in a country, if there **had** been an animal reservoir, we would've seen outbreaks, which occurred, apparently, spontaneously. This we **didn't** find. If we had an outbreak in a country thought to be free of smallpox, it always turned out that we could trace the first case back to a known infected area.

There were many meetings with various research people, it was discussed at considerable length and the unanimous decision was that there was no apparent animal reservoir, but to prove a negative—that there is **none**—is almost impossible.

### Biological Warfare?

In the 1969 movie developed from the James Bond book by the late Ian Fleming—*On Her Majesty's Secret Service*—a strain is about to be unleashed on the world through chickens as carriers in a biological warfare attempt. How likely is it that the lab-contained smallpox viruses could be used in this way?

We think it's unlikely. There is, as you know, a Convention that's been signed concerning biological warfare, but it could, of course, be broken. There is a possibility that one **could** take the virus, aerosolize it and infect a lot of people. In the case of **this** disease, it

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has the highest fatality rate of **any** we know, and will spread in **any** area, but the important thing about smallpox is that it doesn't spread that **rapidly**, and this fact helped us in the program.

Even if, let us say, a thousand people were infected today, there's a two-week incubation period **before** you have the **next** cases, and another two-week period after that and so on. The average person who gets the disease gets a very high fever, feels absolutely miserable and usually takes to bed. About two-four days later, a rash begins. It's not **until** that rash begins that he starts to transmit the virus, so the average patient isn't out circulating in the community—he's flat in bed. This restricts the frequency of transfer of the disease. The average case usually infects only two-five other people; so as a biological warfare agent, smallpox isn't so good, plus, you **do** have a vaccine, which can be brought in very quickly and widely-administered. There's also a reserve of 200 million doses being kept by the WHO, and many other countries are keeping their **own** reserves in case of the unlikely happening. There are a lot of **other** agents that could be used that would continually propagate and cause a lot of trouble, though. Smallpox isn't considered one of the better ones, and the other agents are not as restricted to so few laboratories, either, but are readily available for usage.

### The Last Case

**When was the last case of smallpox reported—and where?**

The last naturally-occurring case was Oct. 26, 1977. His name was Ali Maow Mallin, a 23-year-old cook who live in Merka, Somalia. He recovered. Following that, there was a two-year period of search to be sure there **wasn't** another one. That process concluded on Oct. 26, 1979. A reward was offered to anyone who could find a case, an intensive, house-by-house search throughout the entire previously-infected area went on over and over again. A lot of cases of chicken pox, scabies and many other skin diseases were investigated—but none were smallpox.

### Why Smallpox?

**Why was smallpox singled out as opposed to any other disease? Was it felt that smallpox was controllable?**

No. It was "do able," but a very important factor was that, clearly, smallpox was the most devastating of the diseases—the one that **all** the countries were concerned about. Most people don't recall smallpox as it was. In Asia, we had a 20-40% death-rate, no drugs that could treat a case, no therapy at all. We only had a vaccine to deal with it in terms of a preventive measure and that was effective.

When introductions occurred into Europe or America, the death-rates were comparable. All countries were concerned about it. Up until 1971, the US was vaccinating 15 million people yearly, with 6-12 deaths as a result of complications of vaccination, for a disease that hadn't occurred in the US since 1949. There was real worry about it! The British had seven hospitals kept on a standby basis to be opened only when importations of smallpox occurred so they could hospitalize them.

### Why in Britain as opposed to anywhere else?

They had a large number of importations from Asia: India, Pakistan, Bangladesh, etc. When an importation occurred, there was real fear—panic in the streets.

### Others?

**Are there any other diseases now being talked about or possibly scheduled for a similar type of program?**

Not for eradication. I don't see another we **can** eradicate at this time. In theory, we could eradicate polio and measles—diseases in which **man** is the only host, but these aren't serious diseases contrasted to smallpox, and vaccines are more expensive, not so efficacious or so stable or there are other, constraining factors. What **has** happened is that a second program was developed, which is called the Expanded Program in Immunization, which is gaining tremendous momentum in a very short period of time. This is an effort to make available to children throughout the world the major vaccines we use in this country: for diphtheria, whooping cough, tetanus, measles and polio plus BCG (tuberculous vaccine) which we don't use in this country. It's hoped that, by 1990, they'll be reaching 85-90% of **all** children throughout the world.

### One World

**Are there many international efforts of this kind that go on—not just medical?**

Yes. There're quite a number of them in a vast variety of spheres—economic, social and scientific, but some are more successful and more productive than others. The smallpox effort was more visible, evident and clearly a total United Nations effort.

**It must've been very exciting for you to be involved in it.**

It was! Somebody told one of our senior staff, "You'll never hit a peak like this again!"

**Having participated in an effort like that, and seen it work, does that give you hope for the future?**

It gives me a lot of encouragement, particularly, I would say, with this program, because we had many younger people involved in it from all the different countries. The camaraderie that developed—the feeling of mutual respect—has been amazing. There's a network of former smallpox people who'd been in the program who **do** keep in touch all across the world. When you see it going on in such a non-political sphere, it gives you hope for **other** things, too, and, more than that, I think if the bridges are validly going to be built, one needs to do it as solidly as possible. The first step **is** health. Other things have more political connotations and problems. **This** is why I think we really need to develop the support for international health efforts. It may be far more important than any **other** effort we make in building that sort of base of understanding.

### His Family

**What does your wife do?**

In Geneva, she was raising the family, and now she studies here parttime at the School. She's very interested in population problems as a student, and also as a volunteer for Planned Parenthood of Maryland. In Geneva, she was on the Governing Board of the International School.