Reflections on the Life and Legacy of Richard Evans Schultes

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If anybody could be named as the father of Ethnobotany, it would be Richard E. Schultes (1915-2001). No researcher has ever done more field research, more to promote the discipline, and has encouraged more students to become ethnobotanists, with almost every senior scientist in the field acknowledging some connection to Schultes. Well known scholars like Mike Balick, Robert Bye, Wade Davis, Doel Soejarto, and Andrew Weil were all Schultesians, but Schultes also inspired generations of non-academics and always freely shared his time and advice. Schultes published almost two dozen books and almost 500 papers, collected over 30,000 herbarium numbers, often with dozens of copies, conducted continuous fieldwork in the Amazon for over 14 years, and created what can only be called the golden age of Economic Botany. How did Schultes, growing up in a poor second generation immigrant family, come to such fame? Who was this man, fluent in ten languages, who spent his entire career linked to or at Harvard, and who became the focal point of generations of useful plant researchers and plant users, and who created a by-any-account magical work setting that gave unrivaled opportunities to students, staff, and visitors? And how could it happen, that the legacy of a widely honored scholar was quickly forgotten at his home institution, and his incredible plant material and artifact collection was left to accumulate dust in a Harvard attic?

For many ethnobotanists, talking about Richard Evans Schultes (Fig. 1) is like talking about god – and how can one even attempt such a thing, especially when one has never had the privilege to meet the man? This was a challenge I faced when I was asked to contribute a lecture on Richard Schultes to the "Botanists in New England" Symposium of the Economic Botany and History Sections of the Botanical Society of America in 2010. My initial strategy, and perhaps the only way to appreciate Schultes' thinking, was to simply head out into the field, somewhere in the upper Amazon, to collect plants and think about how to meet this challenge (Fig. 2).

Apart from "One River," Wade Davis' biography of Schultes (Davis, 1996), astonishingly little has been written about the founder of modern ethnobotany. Even the most complete bibliography in the obituary by Prance (2001) is far from presenting a complete picture of Richard Schultes' extensive writing. How could it happen that the "father of ethnobotany" is nowadays often unknown to students, and maybe only vaguely known to colleagues, despite his reputation as the man who "discovered" almost every single psychoactive species known in the New World?

For example take myself. When starting my ethnobotanical work, a friend asked me "So, do you know Richard Scholtees?" (At least that is how his name sounded to me, and the mispronunciation certainly did not help. I simply had no clue who that might have been.) So, "Richard who?" was my understandable answer. Schultes himself would most certainly have flinched at the mangling of his name. He was very well known for insisting on the correct spelling and pronunciation of Latin, Greek, and any other language.

Who was this man, who collected over 25,000 botanical specimens, wrote two dozen books and almost 500 scientific papers?

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Figure 1. Richard Schultes in the field. Photo courtesy of the Schultes family.

Schultes, pronounced like the "u" "o" in "who", and the "e" like "e" in "the," had an unlikely background for someone who was to become the world's most famous ethnobotanist. Born in 1915 to a poor working class family in East Boston with German and English roots, Schultes excelled at school, especially in the Classics, and ultimately earned a stipend to attend Harvard Medical School in 1934. Looking to fulfill his pre-med science requirements, he happened to walk into Oakes Ames' Economic Botany class, a fateful event that determined the course of the rest of his life.

When asked to review an ethnobotanical study for a class assignment, Schultes, hard pressed for time, grabbed the thinnest volume on the book desk, *Mescal – the divine plant and its psychoactive effects* by Heinrich Kluever, and literally got hooked. The very next class Schultes asked Ames if he could write his thesis about the plant, and from this point his research life inevitably took on a different character.

In 1936, Schultes, together with colleague Weston LeBarre, piled into an old Studebaker and headed west from Massachusetts to Oklahoma to study peyote use amongst the Kiowa. It is hard to imagine how difficult it must have been in those days to make such a trip. Over endless days on rutted roads the car broke down constantly. What also made the trip unusual was to have a botanist going into the field to talk to people. Botanists traditionally ventured out to collect plants. "Collecting stories" was more the task of anthropologists or linguists - "soft scientists" - as many molecular oriented biologists still believe. On this trip, a botanist and an anthropologist were working together! For Schultes, the experience of being in a strange setting under the full effects of the *Lophophora* compounds, must have quite profound. Photographs from the journey, nevertheless, always show a perfectly groomed Schultes, while LeBarre definitely shows the effects of all-night peyote ceremonies. This was to become a trademark of Schultes: always conservatively and correctly dressed, rather more like a Victorian professor than somebody who during the 60s would lecture on mind-altering substances. Only one year after his first trip to the Kiowa, the young Schultes was found testifying to congress in support of the legalization of peyote in traditional ceremonies. Quite a stand for a young, unknown botanist.

Figure 2. Rainer Bussmann in the field, Alto Marañon, Peru, 2010, musing about R.E. Schultes. Photo courtesy of the author.

Despite his conservative appearance (Schultes is rumored to have always voted in presidential elections for Elizabeth II as a write-in candidate and always lectured in coat, tie, flannel trousers and a white lab coat) Schultes was a great advocate for personal choice. He abhorred government interference in one's personal life and decisions, and despised the Kennedy clan, whose patriarch made his fortune in bootlegging during prohibition, when the brewery where Schultes' father worked was forced to shut down.

After finishing his undergraduate thesis on the Kiowa's plant use, young Schultes immediately embarked on another project, the identification of "Teonanacatl" and "Ololiqui," two plants sacred to the Aztecs that had defied attempts to scientifically identify them. The task led Schultes, by any kind of transport imaginable, deep into the then most remote corners of Mexico (Fig. 3). In a remarkably short time, the young botanist managed to solve a mystery that had confounded colleagues for centuries. Teonanacatl turned out to be a group of mushrooms, mostly *Psilocybe* spp. and *Paneolus* spp., while Ololiqui was identified as *Turbinia corymbosa* (L.) Raf., a morning glory. Both contained essentially the same psychoactive compounds chemically similar to LSD, and it would take more than 60 years to prove that the psilocybin in the seeds of *Turbinia*, identical to the compound

Figure 3. Oaxaca, 1938. Photo courtesy of the Schultes family.

found in "magic mushrooms," is in fact produced by a fungus that frequently infects the plant, rather than by the vine itself. The re-discovery of the identity of these two Mexican hallucinogens by Schultes earned him a Ph.D. in 1941. His work would later become the foundation of the psychedelic era, when colleagues, like Timothy Leary, dug up Schultes' papers on the subject, started to experiment with the plants, and made the properties of the plants known to the public. Schultes himself would always criticize the recreational use of plants and their psychoactive compounds. This, however, did not keep him from traveling the states to defend students accused of smoking marijuana. His argument was simply that *Cannabis indica* (the prohibited species) was in a ground up stage not distinguishable from Cannabis sativa, which was still widely grown for fibers and perfectly legal at that time. This effort certainly added to Schultes' fame among students and colleagues.

After finishing his Ph.D. in 1941, Dr. Schultes faced two choices: Either start teaching at a small college, or accept a government assignment to head to the Amazon to collect data on arrow poisons. Oakes Ames had offered the following advice:

> "If I were a young man beginning my career all over again, I should try through intensive research in economic botany and ethnobotany to bring more light into the intellectual realm and to take my place, not in a labo-

ratory cubicle, but in the world…" (Oakes Ames to Schultes 1941; Ames et al. 1980).

Schultes chose to head for the Amazon, not knowing that this would keep him in the Columbian Amazon almost without interruption until 1953 (Figs. 4 and 5).

America's entry into WWII found Schultes deep in the tropical forest. Returning to Bogotá to volunteer, he was rapidly incorporated into the war effort. Natural rubber supplies came at that time, and still come, mainly from plantations in SE Asia. These were occupied by the Japanese in 1942. Although the US petrochemical industry started a synthetic rubber program, and the USDA planted rubber yielding plants, especially dandelions (*Taraxacum officinale*), in almost every state, rubber from *Hevea* spp. was simply irreplaceable. Planting the species in the new world (e.g., in the humongous *Hevea* plantations at "Fordlandia" in Brazil) had failed because of rampant leaf blight infections. To remedy this situation, the US government established the Rubber Reserve Company, to collect all recyclable scraps of rubber, and find new sources in nature. Needed most were blight resistant varieties, as well as a way to again extract rubber from natural populations found in the Amazon basin. Both tasks were part of the assignment given to Schultes that would keep him busy for most of the next 14 years. During this time, Schultes traveled an area the size of Belgium, mostly on foot and dugout canoe, mapping thousands of individual rubber trees and providing seeds for the establishment of blight resistant trial plantations

Figure 4. Richard E. Schultes in Columbia, between 1946 and 1952. Photo courtesy of the Schultes family.

Figure 5. Macarena, Columbia, 1951. Photo courtesy of the Schultes family.

in Colombia and Central America. At the same time, he managed to collect almost 25,000 herbarium numbers, and documented the uses of 2,000 plant species among two dozen different tribes. The attitude that made his task possible was certainly his willingness to respect everybody, treat them fairly, and honor the value of local knowledge (Fig. 6). This work, in particular during the first half of the 1950s, would be the basis for over 400 papers and two dozen books.

In 1953, the government suddenly reversed its position on natural rubber. Some bureaucrat decided that, with the end of the war and the advance of synthetic rubber, the natural rubber program was no longer needed. Schultes and colleagues had to wrap up work and leave. The trial plantations were ultimately cut down, the collected material was forgotten. This would prove a rather shortsighted decision, as we will see later.

Schultes returned to Harvard and in 1953 became Curator of Oaks Ames' Orchid Herbarium. As a result he had to concentrate all his efforts on Orchids, which left virtually no time for ethnobotanical work. In 1958, Schultes was finally given the position of Curator of Economic Botany. Despite his tireless work, however, it took another decade before he was named Executive Director of the Harvard Botanical Museum in 1967, and Director in 1970. During his tenure at Harvard, Schultes worked tirelessly on the ethnobotany of the Northwestern Amazon, describing a

Figure 6. Yayacopi, Rio Apaporis, February 1952. Photo courtesy of the Schultes family.

plethora of new species from his collections, and publishing the results of his long term Amazonian studies.

Although Schultes for many years taught one of the most popular courses at Harvard, and had found his real vocation in teaching and advising students, he only became a professor in 1973. Many of his students went on to become well known ethnobotanists and medicinal practitioners, including Tim Plowman (deceased), Mike Balick (New York Botanical Garden), Bob Bye (Universidad Nacional Autonioma de Mexico), Djaja Soejarto (Chicago Field Museum), Jim Zarucchi (Missouri Botanical Garden), Andrew Weil (Weil Lifestyle), Mark Plotkin (Amazon Conservation Team), and Wade Davis (Explorer in Residence at National Geographic Society).

Schultes encouraged students to follow their dreams, rather than working on thesis subjects of the kind described by Oakes Ames in a letter to Schultes in 1940:

> …cover the procedure under which some of these lads write…. 1. Find some topic devoid of human interest. 2. Sift out every spark of human interest and write so badly….that your ambiguity seems to imply erudition. 3. If you are capable of giving birth to a single worth-while idea, conceal. 4. Write a cryptic summary. (Ames et al. 1980)

Among his many accomplishments, Schultes published the "Harvard Botanical

Leaflets" for decades, was editor of the journal *Economic Botany* for 15 years, wrote hundreds of book reviews for the journal, and was a leading figure not only in the establishment of the Society for Economic Botany, but also in the creation of the International Society for Ethnopharmacology. Simultaneous to his academic work, Schultes started to advocate the need for conservation in areas like the Amazon, as well as the preservation of traditional knowledge associated with plants found there. During his career, Schultes received countless honors, including Distinguished Economic Botanists (1979), the Tyler Ecology Prize (1987), gold medals of both the Linnaean Society and the World Wildlife Fund (1992), election as a Global 500 Forum laureate (1994), and the highest order of Columbia given to both civilians and military.

However, despite his publication and teaching record, and despite all national and international recognition Schultes received, Harvard did not deem it necessary to maintain his legacy. As soon as he retired in 1985, his journal was closed, his famous lab dismantled, and his huge collection of ethnobotanical material placed in an attic, where it remains, largely uncurated, to this day.

One of the plants Schultes' students worked on intensively was coca (*Erythroxylon novogranatense* (Morris) Hieron and *E. coca* Lam.), the sacred leaf of the Andes and today the notorious source of cocaine. Schultes' students noted decades ago that the traditional use of the plant is in fact harmless, contributes to a balanced nutrition, and had nothing whatsoever to do with drug use and production. The plant has nevertheless now become the central focus of the so called "war on drugs." Rather than addressing the social problems that foster drug use in the "developed" world, including the US, the US government has spent billions of dollars in recent decades to wage chemical war, fumigating millions of acres of coca fields, especially in Columbia. This effort very much reminds me of the use of Agent Orange in the Vietnam war, and coincidentally the herbicides used in the war on drugs are produced by the same companies that supplied defoliants to the military during the 1960s and 1970s. Unfortunately, the coca eradication program destroys not only coca, but all other crops, like coffee and corn, and has detrimental effects of the health of the local population. Ultimately, the chemicals affect the whole ecosystem, and with it the traditional knowledge Schultes took great care in documenting.

This brings us back to Schultes' original rubber work in the Amazon. Despite the advances in synthetic rubber production, natural rubber remains the material of choice for highest quality products and applications, from gaskets, space and military applications, to surgical gloves and condoms. Even radial tires cannot be produced without natural rubber, and 95% of the production is still coming from plantations in SE Asia. Unfortunately, due to faster transport possibilities in a global economy, leaf blight has finally reached that region, and while outbreaks have been small, the danger exists that the supply of one of the most important commercial and strategically important natural products could be disrupted by a large scale outbreak of blight, whether "natural" or caused by an act of bioterrorism.

Sadly enough, the blight-resistant clones Schultes and colleagues collected have been destroyed, and his priceless collection is slowly turning to dust. Once lost, the material will be hard to replace, because botanists who can correctly identify the material are themselves

critically endangered; most Botany programs in the US have been replaced by "more useful" molecular science. The regions where Schultes collected, even if collection permits were issued (which is very unlikely, given that the US still has not ratified the Convention of Biological Diversity), are coincidentally exactly the areas that we have systematically fumigated in our ill advised strategy to eradicate coca, and little of the natural vegetation remains.

German colleagues have already reverted to what The Economist, oblivious to the efforts of the Rubber Reserve Program, named one of "The 50 best inventions 2009:

> "DANDELION Rubber: A fast-spreading fungus is ravaging the world's rubber trees. But thanks to researchers at Germany's Fraunhofer Institute for Molecular Biology and Applied Ecology, there's now an alternative: dandelions. Scientists have long known that the weed's sap contains latex, but it's difficult to harvest because dandelion ooze polymerizes — goes gummy — when it hits the air. The Fraunhofer team overcame that sticky problem by switching off a key enzyme. The new, improved dandelion produces 500% more usable latex than the old weed does."

Welcome to the past….

Richard Schultes died 10 years ago, and it is high time to honor his legacy and make sure that his groundbreaking work is no longer neglected.

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