

### **The Measles Epidemic of 1968.**

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Among the allegations made in *Darkness in El Dorado*, the one that received the most attention was Tierney's claim that research by the human geneticist James V. Neel in 1968 might have exacerbated the effects of a measles epidemic among the Yanomami. The Peacock Report and the charge from the AAA Executive Board to the El Dorado Task Force suggested that the Task Force consider these allegations.

This allegation was publicly made only by Terence Turner and Leslie Sponsel (Turner<sup>1</sup> and Sponsel, Letter to Lamphere and Brenneis, August ? 2000) repeating a claim made in the galley proofs of *Darkness in El Dorado*, that Neel started the 1968 measles epidemic in order to test his hypothesis that headmen would show lower mortality than others in the Yanomami population. This claim does not appear in the published book. This allegation has also been reviewed by the International Genetic Epidemiological Society ([www.genepi.org](http://www.genepi.org); Morton, 2001), the University of California, Santa Barbara ([www.anth.ucsb.edu/chagnon.html](http://www.anth.ucsb.edu/chagnon.html)), the University of Michigan ([www.umich.edu/~urel/darkness.html](http://www.umich.edu/~urel/darkness.html), local copy), The National Academy of Sciences (<http://www4.nationalacademies.org>), and the medical team of the Federal University of Rio de Janeiro (Lobo, et.al, 2000) among others. In addition, scientists involved with the development of measles vaccine, including Samuel Katz (<http://www.psych.ucsb.edu/research/cep/eldorado/katz>) have reviewed the allegation. All of these sources found that the allegation was completely without merit. The AAA El Dorado Task Force joins these other groups in finding this allegation to be without foundation.

Although this most serious allegation against Neel has been rejected, discussion of his role in the epidemic has continued since the publication of *Darkness in El Dorado*. Tierney's published book (2000) did maintain that the Edmonston B vaccine used by Neel was "one of the most primitive measles vaccine [sic]" (Tierney 2001:55), and was "dangerous" (Tierney 2001:56). Tierney suggested that Neel had chosen it because it "provided a model much closer to real measles than other, safer vaccines in the attempt to resolve the great genetic question of selective adaptation" (Tierney 2000:59). Turner (2001) and Stevens (2001) continued to develop this allegation that Neel's program of vaccination had an experimental as well as a humanitarian purpose: to permit Neel to document differential effects of the vaccination in an unvaccinated population. However, they believe that Neel abandoned this research goal once the vaccination program had to be speeded up in the face of a spreading epidemic. Turner (2001) has also alleged that Neel was inappropriately committed to meeting the goals of his research program, over and above his concern for Yanomami well-being, and even considered dropping the vaccination program, which had taken up an unexpectedly large amount of time. Further, Turner believes that he gave insufficient attention to the health needs of vaccinated Yanomami, many of whom suffered flu-like reactions to the Edmonston B vaccine. Finally, Turner believes that Neel may not have been sufficiently careful with quarantine, given that his journals and autobiographical statements note that he had an upper respiratory infection while he was in the field. Turner concludes that Neel's priorities, with which he disagrees, were in a sense inherent in the kind of large-scale grant-funded scientific program represented by the 1968 expedition. The Task Force felt it necessary to address these recent allegations during our inquiry.<sup>ii</sup> Through interviews and reading of the available documents, we determined that Neel used the following procedures.

The major allegation made by Tierney (2000), that Edmonston B was chosen because of its experimental value, was downgraded by Turner to a claim that Neel chose this vaccine without regard for potential side effects. Terry Turner (2001b) states "Neel simply did not care enough about the more severe reactions to the Edmonston B...to forego the free donations of the vaccine from the manufacturer".

We will examine this question in addition to the following questions that remain about the conduct of the participants of the 1968 expedition:

1. The vaccination program was based on a scientific experiment and not on a humanitarian effort.
2. There was no consultation as to which vaccine to use or how to administer the vaccine
3. There was no permission from the Venezuelan government to vaccinate
4. Neel received 2000 doses of vaccine but only had 1000 in Venezuela. What happened to the other 1000 doses?
5. There was an experimental protocol to vaccinate half the inhabitants of the village
6. Neel waited in Caracas before entering the field when he knew an epidemic was in progress

7. Neel was in conflict because he was more interested in the science than in the humanitarian efforts to help the Yanomami
8. Neel had an upper respiratory infection when he entered the field, thus evidencing little concern for the health of the Yanomami.
9. Neel did not have informed consent for his collections..

1. The measles vaccination program was part of a scientific experiment and not a humanitarian effort.

Neel discusses a vaccination program beginning in 1967. Blood samples taken during the 1966/67 field season were tested for antibodies to measles and other infectious diseases (Neel, et al., 1970). There is no mention in the correspondence, field diaries or grant proposals to the Atomic Energy Commission (Atomic Energy Commission AT(11-1)-405,1960 (Continuations 1961, 1962); AT(11-1)-942,1965; AT(11-1)-1552,1966; AT(11-1)-1552,1967; AT(11-1)-1552,1968; AT(11-1)-1552,1969; AT(11-1)-1552,1971; AT(11-1)-1552,1972; AT(11-1)-1552,1973) that there is any experimental protocol regarding the measles inoculations. Indeed, it seems to be completely a humanitarian effort.

Some of the relevant documents in the Neel papers include the following. In March 10, 1967 Neel writes to Hawkins asking about inoculating for smallpox, tuberculosis and measles: Measles vaccination the most difficult because it must be kept frozen and the most expensive.

Neel's 15 September 1967 correspondence to Hingson is indicative of his understanding the importance of inoculating "virgin soil" populations: "We would welcome the opportunity to inoculate against [measles, smallpox, pertussis, tuberculosis] (assuming the Indians...would accept this)." He specifically addresses the notion of humanitarian concerns that are not in conflict with his scientific mission: "In addition to our scientific interests...we are impressed by the humanitarian opportunity here. As you must know, when a group such as this comes in contact with our culture, the decimation is fearful to behold."

A later letter from Neel (19 September 1967) to missionary Daniel Shaylor expresses the same concerns for the health of the Yanomami: "measles and whooping cough, not to mention smallpox and tuberculosis have not reached these Indians to any significant extent, and we are considering whether we could do some type of inoculation which would minimize the effects of these diseases when they finally do reach the Indian."

On November 21, 1967 Neel writes to Shaylor "Although our orientation is primarily research, we also are quite concerned with the humanitarian implications of extending proper medical services to the Indian, and would try very hard to lay a vaccination program onto our medical studies."

2. There was no consultation on which vaccine to administer.

As soon as Neel realized that measles was an imminent threat to the population he actively sought donations of measles vaccine. After his return from the field, he continued to try to get additional donations of vaccine. In April, 1968 Neel states that the CDC told him which companies to approach.

On April 22, 1968 Neel writes to Roche "Following receipt of your phone call, I contacted our Communicable Disease Center in Atlanta, Georgia, who suggested that I turn to Merck, Sharpe and Dohme, and to Philips Roxanne."

Neel attended a meeting at the CDC before he left for the field in November, 1967. Lindee (2001) indicates that he discussed vaccines and the vaccination process with them. He received gamma globulin from Parke Davis to administer with the measles vaccine to reduce side effects.

There have been numerous responses from epidemiologists and measles experts that Edmonston B was in use during the time period and was a reasonable choice (see IGES, NAS, Katz references cited previously). In addition, in April of 1968, Merck-- the manufacturer of the Schwarz vaccine -- appeared to be in a contractual agreement with the Venezuelan government and did not want to jeopardize this with a donation to Neel.

It should be noted that Neel had very little time to arrange for a large donation of vaccine. Shaylor wrote to Neel late in November about a measles outbreak. Neel was leaving for the field early in January. Also, there was no money for the purchase of the expensive measles vaccines and Neel was dependent on donations.

On November 28, 1967 Shaylor wrote to Neel: Measles has reached Guaira Indians in Brazil and are preparing for the worst.

It probably took at least a week for Neel to receive this.

On December 11, 1967 Shaylor wrote to Neel: Reports of measles coming down the Orinoco from Brazil

After receiving the information from Shaylor Neel contacted several pharmaceutical manufacturers and got 2000 donated doses (received on December 19, 1967) of Edmonston B vaccine.

3. There was no permission from the Venezuelan government to vaccinate.

On December 11, 1967 Neel wrote to Miguel Layrisse, a human geneticist at the Venezuelan Institute for Scientific Investigations (IVIC):

“I believe I can obtain about 2000 immunizing doses of vaccine free. CAN YOU OBTAIN PERMISSION FROM THE VENEZUELAN GOVERNMENT FOR US TO VACCINATE ALL THE INDIANS WE COME IN CONTACT WITH?”

There is an undated hand-written note that corresponds to this letter from Layrisse. It states in language that mimics the Neel letter:

“Agree bring 2000 immunizing doses measles vaccine”

This is not to be confused with the dated permission from Marcel Roche (another IVIC scientist) in 1968 concerning an additional donation of vaccine.

4. Neel received 2000 doses of vaccine. He brought 1000 into Venezuela. What happened to the other 1000 doses

On January 11, 1968 Neel was in Washington and dropped off 1000 doses in Georgetown. These were transferred to a representative of the Unevangelized Fields Missions (UFM) to be carried to Boa Vista and the Yanamomi there. This is confirmed in two places; by a letter from Napoleon Chagnon to Dan Shaylor (December 20, 1967) saying they would be dropping 1000 doses off in Georgetown and by an entry in Neel's field diary. 1000 doses were carried by Neel into Venezuela

This is not to be confused with the April 26, 1968 correspondence (Neel to Philips Roxanne Corporation) which discusses sending another 2000 doses to Venezuela. These doses are the ones that are about to expire and the company suggests doubling the dose, thereby effectively leaving Neel with only 1000 vaccinations (April 22, 1968 Neel to Roche).

5. There was an experimental protocol to vaccinate half the villages.

This idea originates with the January 9 letter from Willard Centerwall (one of the physicians who accompanied the 1968 expedition) purportedly accompanying the 1000 doses of vaccine given to the UFM missionaries. The major points of the protocol are:

1. Avoid vaccinating infants, especially under one year of age, tuberculosis patients, acutely ill people, and persons who are old and/or infirm.
2. Vaccinate only half of the able-bodied village population at one time so the unvaccinated individuals will be able to care for the needs of the vaccinated ones.
3. Vaccinate populations which can be observed during the resting period (8-12 days post vaccination) so that any high fevers can be treated with aspirin and fluids and any bacterial complications can be treated with antibiotics or sulfa drugs.
4. Alert the people being vaccinated that they may feel a bit ill from the vaccination, but not as badly as the disease from which they are being protected.

This is not a research or experimental protocol, but a specific protocol for vaccinating in the field. There is a written addendum at the bottom of the page- if possible compare the reactions of the two makers of the vaccine-canine kidney or egg culture. This is a procedural reporting of information.

Both manufacturers of measles vaccine recommended the administration of 0.01cc/lb of body weight of measles immune globulin (MIG) to reduce the effects of the measles vaccine. The maximum

dose stated is 0.5cc per individual. This dosage is based on trials with children up to a maximum weight of 50 lbs. There had been no studies of the mediating effects of MIG in adults, since adults had either been vaccinated as children or had had measles and were immune. Neel was sent 1000 doses of MIG which translated into 500cc of material. Centerwall noted in the January 10 letter to Francis Black, Associate Professor, Department of Epidemiology and Public Health, New Haven, CT, that this dosage would not be adequate to attend to the needs of adult Yanomami who weighed more than 50 lbs. His letter states:

We have been able to look up most of the references relative to this and find as you suspected no support for 0.5cc of gamma globulin being adequate for measles vaccine modification for average adults. It would appear that the 0.01 cc per pound of body weight or 0.5 cc per individual statement refers mainly to children although it is not so stated and is thus ambiguous. We plan to avoid vaccinating the very young, the old and the acutely ill and will graduate our dosages as best we can on the remainder covering half villages at a time and following with aspirin where possible and when needed.

This implies that in the days before they left for the field they realized they did not have adequate supplies of gamma globulin and decided to do the best they could.

There is no evidence in the field notes that the team followed the half village procedure. In fact, once the epidemic arrived, the field team vaccinated everyone in the villages. The field notes also indicate that the vaccine was given with gamma globulin everywhere but at Ocamo.

6. Neel waited in Caracas for two weeks before entering the field.

Neel's field notes indicate that they spent time in Caracas waiting for transport to the field. They also document his frustration with not being able to get to the field sooner.

7. Neel was in conflict because he was more interested in science than in effort to give humanitarian aid to the Yanomami.

This statement can be found in Turner's recent work. Turner's position is actually a rather nuanced one, that

"science" on the scale of the AEC Orinoco expedition, is not merely an ideal system of abstract truths nor an activity of isolated, autonomous individuals, but a complex social activity, shaped by the collective institutions and sociopolitical conditions that make scientific research possible" (Turner 2001a:59).

Within this social field,

"The relative priority Neel attached to the fulfillment of what he deemed to be the essential parts of his research program ... over the medical needs of the Yanomami ... was to a large extent a function of the institutional requirements, pressures and expectations of government-funded Big Science" (Turner 2001a:59).

Turner bases much of his argument for Neel's ambivalence about the priority of Yanomami medical needs on the following statement in Neel's field notes, especially the last three words:

Thus, I will get stools and soils while Bill does PE for three to four days-then we get blood, saliva, urine (? +dermat.), then inoculate if at all (5 February 1968 entry in field notes:80).

We suggest an alternate reading of the phrase "if at all", as follows.

It is important to note that Neel addresses the vaccinations specifically as a "a gesture of altruism and conscience" (5 February 1968 entry in field notes: 79) Likewise, he notes how frustrating this vaccination process is: "more of a headache than bargained for." However, he *never* suggests that he ever "seriously considered jettisoning the 'altruism and conscience' of the vaccination campaign and [abandon] the vaccinations altogether" (Turner, 2001b: 33); he does, however, clearly state in frustration that he would like to put the vaccinating into the "hands of the missionaries." Moreover, the context of "if at all" must account for the fact that the Indians had a history of fleeing those administering the vaccinations: "they took off in fright when they heard we were giving inoculations" (1 Feb. 1968 entry in field notes: 76). Neel's note about vaccinating "if at all," administering the vaccinations "at the very last." (5 February 1968 entry in field notes: 79), or placing the vaccinations into the hands of the missionaries may be simply

addressing this problem of “flight,” and have no reference at all to any ambivalence on Neel’s part about the vaccination program.

It should also be noted that this was all written before Neel was aware of the magnitude of the epidemic and before the “all-Orinoco” plan was devised. Once he was aware of the magnitude of the epidemic he immediately took steps to prevent further spread of measles. At this point, he gives preventative doses of MIG to those exposed, not yet sick, but not vaccinated. He also administers penicillin to those who are most ill. Neel clearly had a concern for the health of the Yanomami. This is documented by Salzano and Callegari-Jacques (1988) and Neel (1994) who discuss the various tests and other health measures they provided.

#### 8. Neel had an upper respiratory infection and was not concerned with the health of the Yanomami

There is a good deal of information suggesting that Neel gave the health of the Yanomami a very high priority, quite apart from the vaccination program itself. We have not yet contacted medical experts who might help us address the problem of possible contagion to the Yanomami from James Neel’s upper respiratory infection, mentioned several times in his field notes as producing annoying symptoms while he was in the field in 1968. We note that the question of whether Neel’s URI represented a significant source of contagion while he was in the field, raised by Turner (2001a:33-34, 2001b:16-17), remains open. However, the general picture that has emerged from our inquiry is that Neel was careful about medical and quarantine issues.

Ernesto Migliazza, a member of the 1968 expedition, recalls that Neel never entered a new village without taking an M.D. with him and was punctilious in caring for the sick. On first arrival in a new village, medical doctors treated the sick. The doctors then helped in taking samples (blood, stool, saliva, and urine). Three doctors (in addition to Neel himself) were with the expedition, Dr. Marcel Roche, Dr. Willard Centerwall, and Dr. Bill Oliver. In his written report to the task force (Migliazza 01-07-23), Migliazza states that before leaving the U.S. every member of the expedition had a complete medical workup at the University of Michigan hospital, including x-rays, stool and urine samples, and half a dozen vaccinations. Members who were not health care practitioners received training in first aid, and all members received cultural training.

James V. Neel, Jr., MD (Telephone conversation with Hill, ? May 2001) recalls that on the expedition on which he accompanied his father, Neel had sick call every morning, left the expedition group in order to attend to medical emergencies (e.g. problematic childbirth), and insisted that JVN Jr. could not join his father’s research team until he could contribute medical skills legally.

One kind of evidence for Neel’s ambivalence about the priority of Yanomami health Turner (2001a, 2001b) was that Neel’s group did not respond adequately to vaccine reactions that left Yanomami feverish and sick. The task force believes that Turner’s concerns include a contradiction. Turner believes that the team should have abandoned its research schedule to, on the one hand, vaccinate as many people as possible, and, the other hand, to remain in individual villages to treat people with severe vaccine reactions. The expedition consisted of only eight or nine members, so could not really satisfy both concerns. It is likely that pursuing either strategy would have led to problems on the other front.

The view of the Task Force is that Neel and his expedition, dealing with an extraordinarily difficult situation, did the best that they possibly could to address the emergency. However, the experience of the 1968 expedition is indeed an instructive one, and requires us to reflect on its significance for anthropological practice. Can anthropologists be trained to respond more effectively to such emergencies? Should they be so trained? The AAA Committee on Ethics Draft “Guidelines for determining what constitutes a health emergency and how to respond in the course of anthropological research with human subjects” provides a very useful framework within which these questions can be discussed.

Beyond addressing health emergencies, the task force believes that anthropological procedures for work among populations with high levels of health risk require extensive discussion. Anthropologists working among such people might wish to work in teams with health practitioners or seek for themselves appropriate nursing and/or medical education and take adequate medical supplies with them to the field. However, the most practical solution is probably for anthropologists to (a) become thoroughly familiar, through sound research, with the health needs of indigenous populations so that they can give competent advice (cf. Hurtado, Hill, Kaplan and Lancaster 2001), and (b) join in vigorous advocacy for indigenous peoples before their governments. The national professional associations may wish to set up formal

commissions to pursue such advocacy; K. Hill (2001) has pointed out that individual anthropologists risk the suspension of research permits or other reprisals if they “go public” as individuals with advocacy for health care in the local context. Public health and care of the sick is certainly the responsibility of governments, regardless of what type of system they develop to provide it. Both the Brazilian and Venezuelan constitutions recognize health as a basic human right. The Venezuelan Constitution also recognizes the rights of its indigenous citizens to culturally appropriate health care: Title III, Chapter VIII, Article 122 states, “The indigenous peoples have a right to an integrated health care that considers their practices and cultures. The State will recognize their traditional medicine and complementary therapies, within a framework of bioethical principles”. This is an excellent framework within which advocacy can be conducted, permitting the development of advanced health care systems while recognizing the potential of local practitioners to contribute to these.

The AAA El Dorado Task Force recommends that the AAA go formally on record, perhaps in a codicil to the AAA Statement on Human Rights, with a statement to the effect that people everywhere have the right to a healthy environment, to the best possible public health regime, and to a full range of medical care from basic clinical attention to specialized and advanced treatments. The AAA might wish to endorse the Venezuelan position that it is the responsibility of governments to guarantee the availability of such care. The responsibility of anthropologists would, then, be twofold. First, they should develop procedures to minimize the risk to indigenous populations caused by the presence of researchers. Anthropologists should follow rigorous quarantine regulations, ascertaining that they are free of communicable disease before entering the field, and discouraging the presence of others (tourists, film crews, etc.) who may not be subject to such rules. Second, they should strongly encourage research on health and illness in indigenous groups. Third, they should participate in advocacy for fully adequate health care for the groups with whom they work. Indigenous peoples surely feel sickness and death no less than any other human beings, and Yanomami representatives specifically have repeatedly asserted that the need for adequate health care is one of the most pressing concerns in their communities.

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<sup>i</sup> Throughout this document “Turner” will refer to Terence S. Turner. The less frequent references to Trudy R. Turner, member of the AAA El Dorado Task Force, will include her first name.

<sup>ii</sup> We thank Terence Turner for providing us with copies of his most recent manuscript (Turner 2001a) and the manuscript of Stevens (2001).