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Kuru and the Fore

Abstract:

This paper describes the discovery and effects of Kuru disease among the Fore people in the Eastern Highlands of New Guinea. It describes the contributions and controversies surrounding Carleton Gajdusek and the Fore response to foreign influence. Gajdusek was an American doctor who spent much of his life in New Guinea studying the disease and won a Nobel Prize for isolating prions, the infectious agent in Kuru. He deliberately dominated the study of Kuru and held considerable influence in the region. During his stay, his ideals of Western scientific supremacy were challenged and he spread his new respect for the Fore to the other researchers. His presence in the region also proved an obstacle for the Australian government, which was trying to exert power over the indigenous tribes. The paper further examines the Fore response to the government and the foreign researchers. A majority of the Fore people refused to give up their belief in sorcery despite complying with the government or researchers in most other areas. Sorcery epitomized both their regional power and their ability to successfully defy the government when they wished. While Kuru was a terrible disease, its social effects were instrumental in allowing the Fore to accept and reject the characteristics of a new way of life with surprising freedom.

In 1955, Vincent Zigas, the medical officer at a newly established government outpost in the Eastern Highlands of Papua New Guinea, learned about a local malady known as Kuru.¹ It was restricted to the Fore linguistic group and a few other indigenous groups who intermarried with the Fore. Kuru was always fatal, and characterized by emotional outbursts and loss of muscle control. The Fore believed sorcerers within the tribal population caused the sickness. Zigas alerted the Australian government, and as news about the mysterious disease spread, it attracted people from all over the world. The most important of these newcomers was D. Carleton Gajdusek, a pediatrician and researcher from New York who won the Nobel Prize in 1976 for his work on Kuru. The discovery of Kuru led to a cultural collision between the Fore and the Western worldviews of the government officials and researchers who came to the area. Both sides proved unusually open and receptive to the ideas of the other, although the Fore belief in sorcery became a source of controversy. I will argue that Gajdusek's presence coupled with the Fore people's unique response to the Australian government allowed the Fore to avoid subjection by the government and adapt to the changing world in their own way.

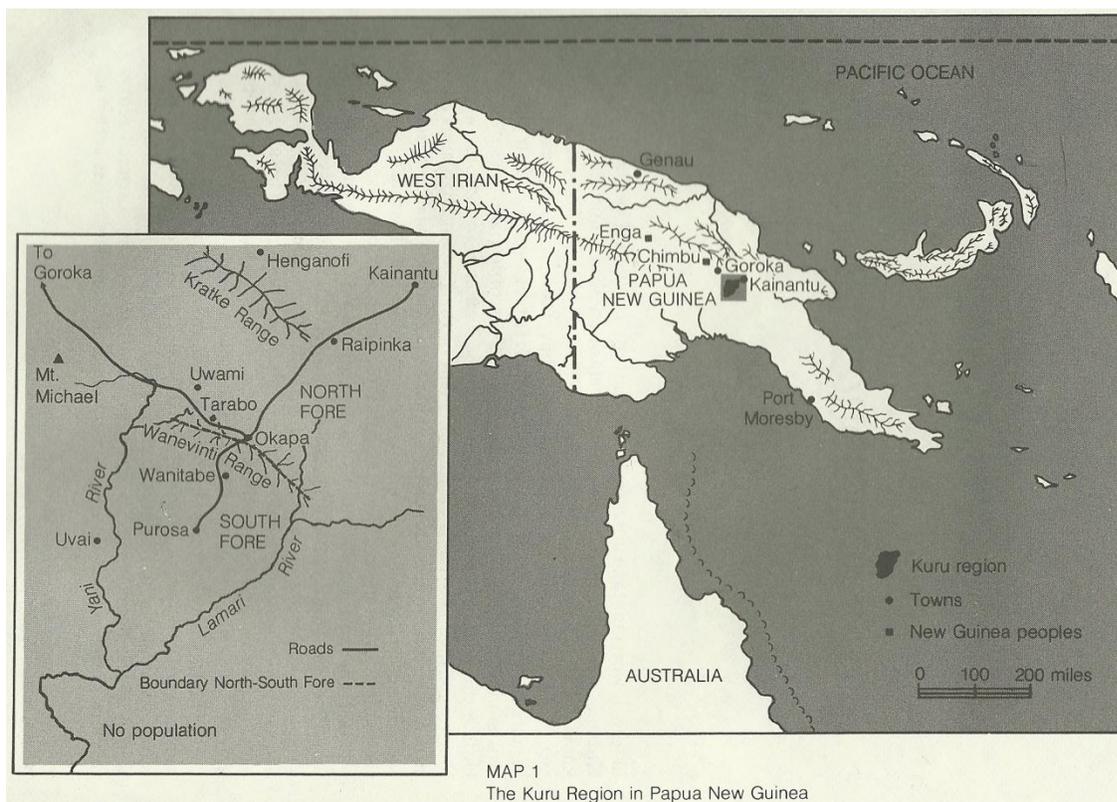
Background

Kuru existed among the Fore for at least twenty years before Zigas and the outside world learned about the disease. Little was known about the Fore at all, mostly due to their geographical isolation. The Fore lived in the Eastern Highlands, a mountainous and densely forested region of about 7050 square miles. Approximately 15,000 people made up the linguistic group, spread throughout multiple, small villages in the Highlands.² Kuru began to kill in record numbers by the 1950s, and around 2500 Fore died from Kuru during the period from 1957-75.

¹ D. Carlton Gajdusek, and Joseph E. Smadel. *Correspondence on the Discovery and Original Investigations on Kuru 1955-1958*. Washington DC, US Department of Health, Education, and Welfare. 1976. p. 50.

² D. C. Gajdusek, and Michael Alpers. Genetic Studies in Relation to Kuru. I. "Cultural, Historical, and Demographic Background. in American Society of Human Genetics" [database online]. 1972 [accessed 9/8/2010], p. 17.

The entire population of the area totaled about 35,000 people distributed among 160 villages.³



The Australian census found at least twenty distinct language groups, with many more dialects, but they all had contact with each other in some form. Some were hostile toward one another, while others maintained trade relations. This interaction was highly localized and based on individual villages rather than the larger cultural and linguistic ties.⁵ Many of the villages were unaware of the extent their own linguistic group since they maintained friendly relations across language barriers. However, individual or family relocation between villages was common, especially in those villages with more closely related languages and cultures.⁶ Anthropologists

³ D. Carlton Gajdusek, "Unconventional Viruses and the Origin and Disappearance of Kuru." In *Nobel Lectures in Physiology or Medicine (1971-1980)*, ed. Jan Lindsten, 305. Singapore: World Scientific Publishing Co. Pte, Ltd. 1992, p. 313.

⁴ Shirley Lindenbaum, *Kuru Sorcery: Disease and Danger in the New Guinea Highlands*. Palo Alto: Mayfield Pub. Co., 1979., p. 4

⁵ Gajdusek, "Genetic Studies", p. 8.

⁶ Gajdusek, "Genetic Studies", p. 8.

and other researchers studied the Fore language and culture far more closely than other groups in the region because of Kuru. The Fore were divided North and South by minor linguistic and cultural differences, but were grouped together for the purpose of government data extraction and Kuru research. Almost ninety percent of the Kuru cases occurred among the Fore people. Cases extending outside of the Fore regions appeared among people with marital relations to the Fore⁷.

The Fore did not keep written records, but proved to have surprisingly accurate memories regarding Kuru deaths in the population.⁸ Researchers confirmed their information by asking the same questions to multiple people and receiving the same answers repeatedly.⁹ The Fore were also familiar enough with the disease to distinguish a new victim almost immediately.¹⁰ Thus, while they did not understand the mechanics behind the disease, they were intimately familiar with its symptoms and course. Kuru predominantly attacked women and children; adult males rarely contracted the disease.¹¹ Nearly a ten to one ratio of females to males died of Kuru in most villages.¹² The disease presented itself in stages, and the victim died within three to nine months after its onset.¹³ The first stage consisted of minor, uncontrolled tremors and jerks along with a state of euphoria. These tremors gave Kuru its name, which comes from the Fore word for shaking. The second stage resulted in tremors violent enough that victims required sticks to walk and stand upright. They would also burst into hysterical laughter, and their eyes rolled

⁷ Michael P. Alpers and D. Carlton Gajdusek. "Changing Patterns of Kuru; Epidemiological Changes in the Period of Increasing Contact of the Fore People with Western Civilization," *American Journal of Tropical Medicine and Hygiene* 14 (5): 852-879. 1965., p. 852.

⁸ Gajdusek, *Correspondence*, p. 57.

⁹ J.H. Bennett, F.A. Rhodes, and H.N. Robson. "A Possible Genetic Basis for Kuru." in Departments of Genetics and of Medicine, University of Adelaide [database online]. South Australia, Oct. 23, 1958 [cited 9/8/2010], p. 171.

¹⁰ Ceridwen Spark. "Learning from the Locals: Gajdusek, Kuru, and Cross-cultural Interaction in Papua New Guinea." *Health and History* 7 (2): pp. 80-100. 2005., p. 89.

¹¹ Spink, Wesley William. *Infectious diseases: Prevention and Treatment in the Nineteenth and Twentieth Centuries*. Minneapolis: University of Minnesota Press. 1978, p. 347.

¹² Gajdusek, *Correspondence*, p. 58.

¹³ Gajdusek, *Nobel Lectures*, p. 317.

uncontrollably. The final stage brought total rigidity of the body, rendering the victim unable to move or talk.¹⁴ Even during this final stage, the victim remained alert and conscious.¹⁵

Historiography

Although the study of Kuru occurred primarily in the 1960s and 1970s, it remains relevant and important today. Kuru was the first prion disease in humans, meaning unfolded proteins cause the illness rather than a viral or bacterial agent. Current research shows that it may be connected with Alzheimer's and other degenerative brain diseases.¹⁶ Moreover, the interactions between the Fore, the Australian government, and Western researchers provide a unique network of relations because of the unusually open exchange of ideas between all of those involved. The major controversies and debates surrounding the study of Kuru focus on Carlton Gajdusek and the Fore belief in sorcery. Most scholars argue Gajdusek went to New Guinea with an imperialist mindset and strong belief in the superiority of Western science and culture. Author Warwick Anderson maintains Gajdusek never loved the Fore people, even after his medical knowledge failed him. Instead, he studied them as scientific objects for twenty years in order to further his own fame.¹⁷ Gajdusek's early writings confirm he believed his medical knowledge vastly superior to anything the Fore could know. In his first letter from New Guinea in 1957, he described "tribal groups of cannibals, only contacted in the last ten years and controlled for five years- still spearing each other as of a few days ago."¹⁸ He went to study a primitive people who needed to be handled by a Western style government in order to be safe to research.

¹⁴ "Plant Medicines may Cause Diseases." *New Scientist*. 16, April 1964, p.11.

¹⁵ Gajdusek, *Nobel Lectures*, p. 325.

¹⁶ John Collinge and Michael P. Alpers. "The End of Kuru: 50 Years of Research into an Extraordinary Disease." *Philosophical Transactions B* (Nov. 27, 2008), p. 3607.

¹⁷ Warwick Anderson. *The Collectors of Lost Souls: Turning Kuru Scientists into Whitemen*. Baltimore: Johns Hopkins University Press. 2008., p. 217.

¹⁸ Gajdusek, *Correspondence*, p. 50.

However, meeting the Fore changed Gajdusek's perceptions almost immediately. A letter he wrote three weeks after arriving in New Guinea shows he was impressed with Fore intelligence and competence, but still regarded them as subjects in his study.¹⁹ The Fore's skill in diagnosing Kuru and other diseases surprised him considerably, along with their detailed and accurate memories of the spread of Kuru. However, Gajdusek wrote "everything in my medical training makes me confident... I stake my entire medical reputation on this matter."²⁰ He further elaborated that the Australian government was jealous of him, and he intended to publish a paper with Zigas to ensure he was credited properly for his work. As Anderson argued, his early writings indicate he was far more interested in science and his career than the people affected by this disease.

However, others such as historian Cerwidin Spark, believe Gajdusek's experiences fundamentally changed his outlook on life. In his journals, he began to describe specific people and their personalities. He hired teenage boys to help him while he travelled throughout the area and researched, and he began to develop close relationships with these boys. As he lived in New Guinea longer, he wrote of his deep respect and affection for the Fore.²¹ In contrast to his early letters and writings, by the 1960s, he believed the Fore were just as civilized as the white men of the Western world. Additionally, he felt it seemed better to die among the Fore, surrounded by friends and family, than in a sterile, Western hospital.²² He also acknowledged the Fore did not have to assist with his research. They knew he was clueless about the cause of Kuru, but generously allowed him to continue working and studying.²³ Other doctors, such as Gajdusek's

¹⁹ Gajdusek, *Correspondence*, p 65.

²⁰ Gajdusek, *Correspondence*, p 67.

²¹ D. Carlton Gajdusek. *Melanesian Journal 1963*. National Institute of Health, Bethesda, Maryland, 1973, p. 51.

²² Spark, p. 92.

²³ Spark, p. 93.

close colleague Michael Alpers, saw him as a man completely at home in New Guinea and regarded his personality and sense of humor as invaluable.²⁴ Thus, the question is not if Gajdusek changed his outlook, but why and how. He came to New Guinea to save the savages with his knowledge, but found he had less knowledge on the subject than the Fore. In the end, did he truly love and respect the Fore, or did he callously use them to advance his own career, and how did his central position in the research affect other Western researchers?

The other question regarding Kuru is not a debate between scholars, but a controversy between the Fore and Western scientists. The Fore readily adopted almost all of the changes enforced or suggested by the government, but firmly retained their belief that Kuru was caused by sorcery.²⁵ Many of the other regional peoples were not as open to the new government, although no one resisted with violence. Other linguistic groups, such as the Gimi and Awa, simply did not abide by the government ordered changes and continued many of their traditional practices.²⁶ Coincidentally, the Australian government, missionaries, and researchers happened to encounter the Fore during a period when the Fore sought change and new methods, making them surprisingly open to the ideas of the West. However, the Fore belief in sorcery and its ties to the mysterious Kuru disease remained the one disagreement between the two sides. The connection between sorcery and Kuru led to surprisingly difficult questions as to how to approach the conflict between incomplete scientific data and long-held cultural traditions. Moreover, the Fore valued their reputation as powerful sorcerers and did not want to relinquish their influence in the region.²⁷ Thus, sorcery came to represent the heart of the issue for both the scientists and the government struggling to establish a new balance of power. Ultimately, the

²⁴ *End of Kuru*, p. 3614.

²⁵ *New Scientist*, p. 11.

²⁶ Gajdusek, *Genetic Studies*, p. 24.

²⁷ Lindenbaum, p. 28

Fore chose to compromise with the government in other ways to maintain their authority, while still rejecting the modern science of the doctors.

The background and role of Dr. Gajdusek

In March 1957, D. Carleton Gajdusek learned about Kuru and travelled to New Guinea to research. Gajdusek was a brilliant man, but remains a deeply controversial figure. Born in Yonkers, New York in 1923, he quickly displayed his skill in science and medicine. He wrote to his mother that he studied medicine because it was fascinating, and he wanted to research rather than work at a practice.²⁸ He ultimately went into pediatric medicine because the rapidly changing bodies of children proved more challenging, and therefore more interesting, than adults.²⁹ He did not want to be tied down anywhere, and secured a job with the National Institute of Health (NIH) travelling around the globe researching. He was in Queensland, Australia when he learned of Kuru from his NIH coworker Joseph Smadel, and was thus well positioned to travel to New Guinea at his leisure.³⁰ Never one to listen to orders or ask permission, he financed the trip himself and began his own, independent research with Vincent Zigas' information.³¹ Gajdusek was skeptical of the reports at first, but fascinated by Kuru once he saw the disease in person. He requested grant money from the NIH to stay in the area and research both Kuru and the regional culture.³²

The Australian government did not appreciate an American conducting new study on Australian territory without their express permission. They had only recently expanded control over the region, and the rugged geography made that control difficult to enforce. They also disapproved of Gajdusek's independent, sporadic research methods and wanted to replace him

²⁸ Anderson, p 38.

²⁹ Spark, p. 81.

³⁰ Gajdusek, *Correspondence*, p. 50.

³¹ Anderson, p. 42.

³² Gajdusek, *Correspondence*, p. 50

with Australian doctor Grey Anderson.³³ However, they could not directly force him to leave since he was under the authority of the NIH and had technically done nothing wrong. Anderson was sent rather unwillingly to confront Gajdusek and begin his own study, but Gajdusek would not be swayed. The government also pressured Zigas to stop working with Gajdusek, but he refused. Ultimately, they decided Gajdusek could not be pushed out and was probably the best man for the job.³⁴

Upon beginning his research, Gajdusek found the Fore view of death and approach to caring for the sick considerably different from the ideas of the Western world. Victims in the early stages of the disease and their families would laugh and joke about Kuru rather than remain in a constant state of mourning. Several researchers observed that the culture as a whole was playful and enjoyed humor despite their elevated death rates.³⁵ The sick remained at home to be cared for by their families. While the victim could still stand and move around, they remained close to the house, and continued to work in gardens and perform jobs around the home. The family stayed with them and supported them until they could no longer speak and death was imminent. At that point, the family stopped feeding the victim, and left them to die in the house.³⁶ Gajdusek noted that they believed it more humane to let the victims die quickly at the end rather than prolonging their suffering with ineffective remedies.

After the victim's death, the women and children prepared the body to be eaten in mourning. Cannibalism was a recent addition to the culture, introduced by a different tribal group around 1900.³⁷ They rationalized that maggots or worms would eat the corpse anyway. It was best for the friends and relatives to dispose of a loved one's body and reabsorb the spirit of

³³ Anderson, p. 84.

³⁴ Anderson, p. 85.

³⁵ *End of Kuru*, p. 3648.

³⁶ Spark, p. 97.

³⁷ Lindenbaum, p. 22.

the dead family member then allow the body to waste in the ground.³⁸ The Fore did not eat people who died of known diseases, only those who died of wounds, natural causes, or sorcery. Every part of the body except the gallbladder was eaten, since the gallbladder contains bile. The muscle and brain were cooked in a pit like other meat, although certain relatives ate specific portions of the body. For example, a deceased man's wife would eat the buttocks. The women ground the bones into a powder to be consumed with greens.³⁹ Once the Australian government moved into the area, they discouraged cannibalism, and the practice ceased entirely between 1957 and 1962.⁴⁰

Gajdusek and the doctors admittedly did not know what caused Kuru when they began their study. Researchers disagreed over the cause and type of disease, and medical researcher Cyril Curtain suggested everyone identified what they wanted to see. Many anthropologists suggested Kuru was a cultural response to the intrusion of the Western world, the neuroscientist believed it was a brain disorder, and the geneticists argued for a genetic cause.⁴¹ In the beginning, no one suspected a connection with cannibalism because the doctors did not believe it could be passed orally. Most were firmly convinced Kuru was a genetic disease.⁴² The majority of the Fore never wavered from their belief that sorcery caused Kuru. Interestingly, Gajdusek and those working with him never directly condemned belief in sorcery. Instead, they told the Fore however the disease came to be, there must be a cure, and they were looking for one.⁴³ For the most part, the Fore willingly cooperated with the researchers, but Western doctors remained baffled. This unexpected uncertainty and difficulty was the first true setback Gajdusek ever

³⁸ Gajdusek, *Genetic Studies*, p. 10.

³⁹ Gajdusek, *Genetic Studies*, p. 10.

⁴⁰ Gajdusek, *Nobel Lectures*, p. 317.

⁴¹ *End of Kuru*, p. 3633.

⁴² *End of Kuru*, p. 3614

⁴³ Spark, p. 95.

faced. His medical knowledge was no longer dependable, and he had no solid theory about the origin of Kuru. Once forced to acknowledge his lack of direction, he began to doubt the superiority of Western science. He admitted to both the Fore and the NIH that he was blindly groping for a solution. Thus, it seems unlikely that he regarded the people as nothing more than medical experiments. He openly declared he needed their help and confidence to achieve anything, which is not an attitude one takes toward a lab rat. Gajdusek's openness about his own lack of knowledge coupled with his ready dependence on the Fore indicates he respected them. His early perceptions of a savage people quickly changed, and he soon regarded his Fore colleagues as medical equals.

Furthermore, Gajdusek began hiring many of the locals to help carry equipment, translate from Fore into Pidgin English, and research. Those who worked directly with him often became his close friends, and some continue to research and collaborate with Western scientists today. Gajdusek wanted as many samples as possible and went on a relentless search for bodies and brains throughout the Highlands.⁴⁴ Many Fore were often reluctant to hand over samples, even after they stopped eating the bodies, and regarded the requests to be too personal. They did not want outsiders intruding on their grief. Some did not mind the doctors performing autopsies on bodies, but wanted the brain left alone. Since the brain was the source of the personality, cutting it up would be disrespectful and violating to the deceased. This frustrated the doctors because they believed the brain was instrumental in understanding the disease. The Fore workers tried to convince their fellows that the doctors worked for a good cause, but their efforts did not always meet with success. Additionally, missionaries and doctors set up Kuru hospitals, but few Fore came to them. The Fore preferred to keep the dying at home, and quickly learned admittance to

⁴⁴ Spark, p. 91.

the hospitals did not save lives.⁴⁵ This further frustrated researchers since they had no way of finding or tracking Kuru patients except by physically trekking from village to village looking for them. Gajdusek proved quite skilled at these treks and made himself at home in the jungle. Gajdusek's team continued researching and studying with little success for several years. Obviously, Gajdusek maintained his scientific objectives throughout his research, but, contrary to Anderson's argument, a focus on science did not necessarily indicate he cared nothing for the people.

As research progressed, it seemed likely Kuru was a genetic disease since the children of Kuru victims were more likely to contract it.⁴⁶ A genetic disorder became the preeminent theory from 1957-1962. The other primary theory claimed Kuru was a dietary problem caused by eating indigenous plants, or possibly medicines made from these plants.⁴⁷ However, neither of these theories held up completely, and Gajdusek began to look again at cannibalism. His initial findings fit well with the demographics of the disease since men did not partake in cannibalism, and Kuru primarily affected women and children.⁴⁸ Gajdusek called Kuru a slow virus since it could apparently be dormant for several years after a person engaged in cannibalism. However, he could not locate a specific pathogen under a microscope, nor could he find evidence of an immune response during autopsies.⁴⁹

Despite these medical setbacks, Gajdusek managed to infect a chimpanzee with Kuru in 1967, and later was able to transfer it to minks as well. Although Gajdusek did not understand prions, infecting an animal proved that some infectious agent caused Kuru and could be transferred from one organism to another. Although it was not contagious in a traditional sense,

⁴⁵ *End of Kuru*, p. 3626.

⁴⁶ Bennett, p.169.

⁴⁷ *New Scientist*, p. 139.

⁴⁸ *End of Kuru*, p. 3697.

⁴⁹ Gajdusek, *Nobel Lectures*, p. 308.

Kuru could be passed between people without a necessary genetic cause. This proved to the Western scientists that Kuru was not exclusively caused by genetics or dietary problems. Other researchers noticed the clinical similarity between Kuru and scrapie in sheep, prompting a renewed interest in outside medical communities. Scrapie is a prion based neurological disease that physically affects sheep the same way Kuru manifested among the Fore. Gajdusek continued diligently researching, and the number of Kuru cases began to drop. No one born after the cessation of cannibalism ever developed the disease, further confirming his theory. The familial tendency can be explained because the offspring ate the parent, and mothers fed their young children whatever human remains they ate. Thus, the disease was not passed genetically, but by the custom of eating dead relatives. In 1976, Gajdusek won a Nobel Prize in medicine for his research and contribution to the new field of slow viruses.⁵⁰ Later, others took up the mantle of laboratory research and found in the 1990s that Kuru, along with scrapie and mad cow disease, is caused by prions. Prions are proteins in the brain that unfold and malfunction for unknown reasons. Current research suggests a connection with Alzheimer's and other degenerative brain diseases. There is still the possibility that a genetic component exists in the Fore since other cultures in the region ate their dead but did not develop Kuru.⁵¹

Moreover, Gajdusek monopolized the research by the force of his personality and ambition, but he also prevented the government from gaining complete intellectual control over the Fore. The government could not force total compliance upon the Fore because they had to work around Gajdusek and his researchers. Any violence in the region would have likely upset the NIH and American government. Therefore, Gajdusek was not single-handedly responsible for the Fore reaction to the government. He was simply an obstacle, in addition to rough terrain,

⁵⁰ Gajdusek, *Nobel Lectures*, p. 308.

⁵¹ *End of Kuru*, p. 3755.

that prevented the government from doing anything it wanted in the region. He was a single component among many that allowed the Fore to inspect the government's new ideas and adopt them at their leisure. Furthermore, Gajdusek changed his worldview during the course of his research when his belief in the superiority of Western medical science was destroyed. He entered the area confident, but was frustrated by his inability to understand and treat Kuru. He found the Fore were better at diagnosing the disease than he with all his education, and their methods for treating the sick were perhaps better than those of the West. Neither side understood the disease without the help of the other, and collaboration about Kuru led to a broader, mutual respect. Thus, Gajdusek ultimately came to respect the Fore and saw them as intellectual and social equals. Due to his forceful personality and sense of self-importance, he deliberately spread his new ideas to his fellow Western researchers. This encouraged many foreigners in the region to treat the indigenous people with respect and fairness.⁵² Thus, Gajdusek's presence in the region tremendously influenced the other researchers, their tactics, and views of the Fore.

Even more controversial, Gajdusek began the process to adopt some of the older orphaned boys who helped him in the field. Adoption was completely normal to the Fore and common practice.⁵³ Gajdusek explained he adopted the boys because he loved them and wanted to help the communities that had allowed him to conduct research. He also wanted to give them the same opportunities for education and travel that he had.⁵⁴ Such behavior suggests he believed the boys just as capable of greatness as himself. He ultimately adopted twenty boys over his career and took them to be educated in the United States. Even from the beginning, this raised suspicions, and rumors spread about Gajdusek's true motivation for adopting the boys.⁵⁵ In 1996,

⁵² *End of Kuru*, p. 3632

⁵³ Lindenbaum, p. 44

⁵⁴ Anderson, p. 111.

⁵⁵ Anderson, p. 221.

he was arrested in his New York home on charges of child abuse and perverted practice. Only one of the boys testified against him; the others staunchly defended him during and after the court case. He pled guilty to one charge of pedophilia with a sixteen-year-old and spent one year in prison.⁵⁶ The rest of the boys along with others who knew him maintain his innocence, stating he confessed rather than endure a humiliating public trial.⁵⁷ Other than the defunct practice of polygamy among village leaders, sexual practices among the Fore were primarily heterosexual and monogamous. Accordingly, anything Gajdusek could have done to the boys would be as offensive among the Fore as in the United States. Moreover, many of the other boys who married and had children of their own allowed their children to spend unsupervised time with Gajdusek. They argue they would never do this if he had done anything questionable to them. Gajdusek served one year in prison and then left the United States permanently. He continued his research and involvement with Kuru until his death in 2008. His reputation was tarnished by the arrest and confession, but many of the Fore and his scientific contemporaries still admire his research and determination. His pedophilia charge remains controversial.

Gajdusek paved the way for other researchers and anthropologists to become involved in research on Kuru and the Fore. By the time he won the Nobel Prize, his view of the Fore was not racist or colored by a belief in his own cultural superiority. It seems likely that he retained a sense of personal superiority concerning the whole world, including his Western colleagues. However, Gajdusek's own ego did not get in the way of his ideas of cultural equality. His prolific writing and dominance in the field of Kuru research led other Westerners to view the Fore as significant, intelligent people rather than a primitive, savage culture to study as objects. Whatever Gajdusek's opinion of himself, he certainly contributed to a more widespread respect

⁵⁶ Anderson, p. 222.

⁵⁷ Anderson, p. 226.

for the Fore and other indigenous tribes. He seemed to truly respect the Fore and made many lifelong friendships among them. Gajdusek always believed himself to be outstanding in his field, but his ego did not preclude a true love and appreciation for the Fore as he came to know them. While he never actually cured the disease, he did provide a window to his contemporaries as to how a competent, intelligent non-Western society lives. He respected the Fore, and his work provided a justification to other Westerners as to why they should also respect indigenous culture.

Fore reactions to Western ideas and sorcery

While Gajdusek helped the Western world see the Fore in a positive light, he was certainly not the reason their interactions with the West were so open and accommodating. The Fore had brief contacts with the world outside of the Eastern Highlands during World War II, but the first major contact came in 1947. The Australian government sent a patrol into the northernmost area of the Highlands, and Lutheran missionaries came at the same time. An outpost was established in the area in 1951, and a fully staffed and operational government station opened in Okapa in 1955.⁵⁸ The Australian government began to take a census, which grouped the independent villages together into larger cultural groups for the first time. The Fore never had a group mentality spanning the entire area before the census. Most people in the region knew where individual Fore villages were due to fear of their sorcery, but there was no overarching group identify. This new awareness created a psychological shift among the Fore, who began to identify with a larger cultural unit instead of the village where they currently resided.⁵⁹ Furthermore, the government and missionaries discouraged the practices of cannibalism and polygamy. In addition to the obvious moral motivations of the missionaries, the

⁵⁸ Bennett, p. 171.

⁵⁹ Gajdusek, *Genetic Studies*, p. 18.

missionaries and government officials reasoned that polygamy could spread disease. The Fore already experienced logistical problems due to the higher ratio of men to women and thus had little resistance to the policy. The village heads were the primary polygamists, and as long as they retained their leadership, they did not mind changing that custom.⁶⁰

The government also saw cannibalism as a potential problem, although no one connected it to Kuru at the time. The Fore abandoned cannibalism without much resistance since it had only been around for approximately seventy years, and the men were not particularly involved with the practice. Cannibalism did not have a long tradition to be preserved, and over half of the population did not partake in it. They knew it was a recent practice, and the people were not averse to changing the practice. Although there is no direct evidence, they possibly adopted cannibalism as a way to connect with a hostile tribal group. Now, they wanted to ingratiate themselves with the Australian government, so ending cannibalism was primarily a political, rather than cultural, change. It took several years for the practice to cease over the whole region as the news slowly spread around from village to village. However, funerary cannibalism had completely ended by 1962. Additionally, the government imposed regulations to end rampant tribal warfare. The Fore readily embraced these policies to promote peace. The majority of the Fore villages had been striving to end the fighting since the 1940s in response to their rapidly rising death rate from Kuru and the ritual murder of accused sorcerers.⁶¹ Their eagerness to end tribal warfare also partially accounts for their willingness to change cannibalism and polygamy customs. If a government could bring the peace they sought, they were willing to make other concessions.

⁶⁰E. Richard Sorenson, H. J. M. Claessen, Brian M. du Torr, James Griffith, Paul Hockings, Allison Jablonko, R. A. Littlewood, et al. "Socio-Ecological Change Among the Fore of New Guinea [and comments and replies]." *Current Anthropology* 13 (3/4) (Jun. – Oct. 1972): pp. 349-383. 1972., p. 360.

⁶¹ Sorenson, p. 361.

Unusually, the Fore also readily accepted new economic and judicial systems. The outsiders brought in new food staples to increase nutritional variety in their diets and change methods for acquiring food. The Fore primarily ate pig, the nutrient rich taro root, and green plants⁶². They did have some basic agricultural practices and had no reservation about learning new farming techniques. With the encouragement of the government, the Fore grew coffee and ultimately shifted to a widespread, money-based, coffee export economy. The new mind-set of the Fore helped facilitate the acceptance of a new economic model. Instead of feeding one village, they now desired to sustain an extended area. Another significant change came with the introduction of a formal justice system. This change appealed to the Fore because they were in transition and trying to establish peaceful relations with their neighbors. Since they already sought the advice of outsiders on sorcery, a governmental justice system was a large next step rather than an abrupt transformation.⁶³ The Fore wanted a system to maintain the peace they sought. A new justice system would help ensure that hostile neighboring villages stayed peaceful. They had no tradition of an internal justice system, and already listened to outside arbitration regarding sorcery. Therefore, a new justice system was a major change, but not an alarming one.

On a more practical level, Westerners also brought tools, the most important being the steel axe. Additionally, the government and researchers wanted to make roads to ease travel for themselves, but roads also proved useful to indigenous communities. New tools and technology were clearly useful and desirable, and the Fore were willing to cooperate with the census and some governmental control in exchange for them.⁶⁴ While the government hoped to civilize and control the indigenous people, enforcing these dictates was difficult. The terrain was rough, and

⁶² Sorenson, p. 349, 50

⁶³ Sorenson, p. 362.

⁶⁴ Sorenson, p. 362.

without roads, government officials could not easily monitor the people and force them to comply. Instead, they had to convince the tribal groups that their ideas were worth considering and embracing. The government could not be overly forceful, or else they would be rejected. This can, in part, explain the Fore's willingness to listen to these new ideas. Moreover, adopting new laws and customs was not a new idea for the Fore. They already had a regular habit of moving around in the area, and adapting to the cultures of other villages when they relocated. Migration, marriage, and adoption into other villages was quite common.⁶⁵ Additionally, the doctors brought penicillin and new medical knowledge to cure other diseases. The Fore were eager to learn about new sanitation practices because of their fear of sorcery. Since Fore sorcerers were believed to steal personal items from their intended victims such as hair and excrement, new ways to clean and dispose of waste were welcome.⁶⁶ Ideas regarding plumbing and disinfecting were useful to a culture already interested in sanitation. Overall, the Fore lacked any significant single political authority that might have resisted the intrusion of the new government and ideas. The Fore never clashed with the West before, and saw no reason to immediately distrust the introduction of Western practices and ideas at this point. Instead, they were open to new ideas, and when the ideas were useful, they adopted them.⁶⁷ One other major consideration was the Fore position of power in the region. The Fore were not the largest demographic in the region, but they were the most powerful. People feared them because of their reputation as sorcerers. Although the Fore have not confirmed this directly, it is possible they wanted to retain that power. Allying and cooperating with this new government would be a way to retain that position of power over the other tribal groups.

⁶⁵ Gajdusek, *Genetic Studies*, p. 8.

⁶⁶ Lindenbaum, p. 67.

⁶⁷ Sorenson, p. 362.

However, they saw no reason to accept the Western idea that sorcery was not real. It had long been a part of their culture, and the Fore had a reputation for being powerful, dangerous sorcerers.⁶⁸ Kuru was not the only disease associated with sorcery, but it was the most widespread and deadly. When Gajdusek could not find a specific pathogen, the Fore took this as further evidence Kuru was caused by sorcery and not a medical problem. They reasoned doctors could cure other diseases, but Kuru was too strong for them because of the magic.⁶⁹ A sorcerer allegedly caused the sickness by stealing something belonging to, or closely associated with the victim, such as clothing, scraps of food, excrement, or hair. He then wrapped the item in a bundle with leaves, bark, and a sorcery stone, and tied the bundle with vines. Next, he would use a stick and beat it while reciting the victim's name and saying a spell. As the hidden bundle rotted in the mud, the victim slowly died.⁷⁰ The family of a Kuru victim held the responsibility to find the sorcerer and ritually murder them through a process called Tukabu. This ritual murder involved breaking the vertebrae, ribs, and femurs with stones, and then strangling the accused sorcerer.⁷¹ The accused sorcerer was generally someone from a different village, but one who knew the victim and had poor relations with the family. Gaining revenge on the family or the victim motivated the sorcerer's actions⁷².

The family ascertained the identity of the sorcerer in a few different ways, and some used multiple methods to ensure accuracy. The most common method was divination with a dead opossum. The family placed something of the victim's in a bamboo pipe, and a recently killed opossum in another. They struck the pipes together, called the name of the suspected sorcerer, and placed the pipes in the fire. If the opossum's liver did not cook, the person was guilty.

⁶⁸ Lindenbaum, p. 56.

⁶⁹ Spark, p. 92.

⁷⁰ Lindenbaum, p. 65.

⁷¹ Gajdusek, *Correspondence*, p. 65.

⁷² Lindenbaum, p. 121.

Another method occurred after the victim's death. The suspected sorcerer and their relations were invited to the victim's house for a meal. If someone from the sorcerer's party became ill after the meal, it was a sign that the victim's ghost was exposing the sorcerer. The third way to discover the sorcerer's identity was to travel to a curer from a non-Fore village and ask for the name of the person responsible for a particular case of Kuru.⁷³ Gajdusek suggested Tukabu and the search for the sorcerer was a way for the families to show solidarity with the Kuru victim and try to achieve something rather than helplessly watching their loved one suffer and die.⁷⁴ Men were usually the victims of Tukabu, which served to lessen the discrepancy in the gender ratio. Although Kuru deaths killed ten times as many women than men, the actual gender ratio was closer to three to one, or even two to one males to females in most villages.⁷⁵

A majority of the Fore still believe sorcery caused Kuru. The last known case of Kuru among the Fore occurred in 2005. No one born after the end of cannibalism has contracted it. While it is possible Kuru remains dormant in some older people in the Eastern Highlands, the disease has apparently disappeared. No one ever found a cure, or even discovered what caused the prion disorder in the beginning. The Western world and some of the Fore consider the research conducted by Gajdusek a triumph even though they never actually saved anyone from the disease. However, to this day, many of the Fore continue to believe in sorcery. These Fore explain that sorcery declined with the coming of the new government in the 1950s, so it makes complete sense Kuru declined as well. New cases of Kuru do not occur because no one practices sorcery any more. Thus, with no direct proof to the contrary, and possibly losing their power by accepting the science, it follows that the Fore maintain their beliefs.

Conclusion

⁷³ Lindenbaum, p. 69-71.

⁷⁴ Spark, p. 95.

⁷⁵ Gajdusek, *Nobel Lectures*, p. 316.

In 2007, ninety people directly involved with the study of Kuru held a conference in London celebrating the end of the disease. The participants included Fore, doctors, anthropologists, and lab technicians. Gajdusek was there of course, despite the scandal of his arrest and poor health preceding his death in 2008. No cases of Kuru have manifested since 2005, presumably signifying the end of the disease and an era for the Fore people. A disease that appears mysteriously and disappears again within seventy years is certainly cause for interest, especially one that drew a lifetime of devotion from dozens of researchers from tremendously different fields and backgrounds. However, the discovery of Kuru became much more than a fascinating disease. It set the stage for a rapid and total cultural shift among the indigenous people and a unique interaction between the Fore and West. For better or worse, Carleton Gajdusek stood at the center of this interaction and directed much of the course of Western thoughts and actions. He was an eccentric, egotistical, controversial man, but one cannot discuss the study of Kuru without looking at his contributions. While evading the hostility of the Australian government, he began to research with the help of Zigas and other young researchers who came to the area. Although Gajdusek never cured Kuru or even fully understood it, he won a Nobel Prize for his work in isolating prions. More importantly for this study, his findings, or lack thereof, forced him to change his ideas about Western science. Gajdusek came to respect the Fore people as social equals, and used his influence to compel others do the same.

The Fore themselves learned the extent of their linguistic group and developed a more widespread attitude as a people. The Fore transitioned from basic, subsistence agriculture to a money-based economy that exports coffee into Australia. However, despite these changes arbitrated by the government, the Fore were not oppressed as is the case in many interactions between a tribal group and a government. This can be explained in large measure by the Fore's

willingness to adopt and use the new ideas for their own benefit. The Australians also had to act usually carefully because they had difficulty enforcing laws in an isolated region, and had to contend with Gajdusek's strong opinions and influence. Moreover, the government happened to enter into their lives at a time when the Fore were already seeking changes, and were willing to allow a foreign government to administrate those changes. When it came to Kuru, however, the Fore continued to believe in sorcery. They never had any proof that sorcery did not cause of the disease, and disbelief in sorcery would cause the Fore to lose social status among the other indigenous tribes. Therefore, the Fore maintained their traditional belief while accepting many changes from the government and doctors. The ultimately chose what they wanted to accept from the outsiders, and chose carefully for their own benefit. The unusual circumstances brought about by Kuru allowed the Fore to maintain an unusual degree of autonomy, and they chose to comply with the Australian government in order to keep their power in the region.

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Alpers, Michael P. and D. Carlton Gajdusek. "Changing Patterns of Kuru; Epidemiological Changes in the Period of Increasing Contact of the Fore People with Western Civilization," *American Journal of Tropical Medicine and Hygiene* 14, no. 5 (1965): 852-879.

The authors discuss cultural and social changes in the Fore culture happening as a result of Westerners coming to study the disease. Since they had not ascertained a cause at this time, Alpers and Gajdusek speculate on environmental and cultural causes for the disease and wonder if the changing culture will affect the disease. In doing so, they provide a description of how the culture is shifting in response to both their presence and the disease.

Bennett, J. H., Rhodes, F. A. and Robson, H. N. "A Possible Genetic Basis for Kuru." Departments of Genetics and of Medicine, University of Adelaide, accessed 9/8/2010, 2010, <http://www.ncbi.nlm.nih.gov/er.lib.k-state.edu/pmc/articles/PMC1931994/pdf/ajhg00568-0064.pdf>.

This publication was written by researchers at a University in Australia based on interviews with the Fore, Gajdusek, and his fellow researcher Zigas. The authors are still only guessing at the causes of the disease, but their present theory in this document is based on the demographics of the people and the spread of the disease. They give detailed accounts of the locations, relations, genders, and ages of those dying of Kuru.

Collinge, John and Michael P. Alpers. "The End of Kuru: 50 Years of Research into an 'Extraordinary Disease.'" *Philosophical Transactions B* no. Nov. 27, 2008 (2008). The British publication *Philosophical Transactions B* attended and transcribed speeches and interviews held at a conference in 2008 where all the surviving people involved in the Kuru research gathered to discuss the disease and its cultural impact. It includes fifty interviews with various scientists and doctors, their families, and Fore people alive during the height of the disease. The interviews cover memories of the people living there, the changes caused by the researchers coming, scientific, and cultural views of Kuru over the years.

Gajdusek, D. Carleton. "Kuru: From the New Guinea Field Journals 1957-1962". *Grand Street* (58, Disguises) (Autumn): pp. 6-33, 1996.

This American magazine published selections from Gajdusek's journals specifically regarding Kuru, along with relevant pictures. It provides a shortened but informative view of the early research and the doctor's frustrations.

Gajdusek, D. Carlton. *Melanesian Journal 1963*. National Institute of Health, Bethesda, Maryland, 1973.

This is a complete copy of Gajdusek's personal journal from February through July of 1963. He describes his daily life in addition to his ideas and research on Kuru. He is living in New Guinea for the bulk of the time covered in the journal.

Gajdusek, D. Carlton. "Unconventional Viruses and the Origin and Disappearance of Kuru." In *Nobel Lectures in Physiology or Medicine (1971-1980)*, ed. Jan Lindsten, 305. Singapore: World Scientific Publishing Co. Pte, Ltd., 1992.

Gajdusek presents an overview of his time spent in New Guinea and describes the demographics of the Fore people. He then describes the period of research, the discovery of the cause of Kuru, and the steps taken to eradicate it.

Gajdusek, D. C. and Alpers, Michael. "Genetic Studies in Relation to Kuru. I. Cultural, Historical, and Demographic Background." American Society of Human Genetics, accessed 9/8/2010, 2010, <http://www.ncbi.nlm.nih.gov.er.lib.k-state.edu/pmc/articles/PMC1762162/pdf/ajhg00458-0002.pdf>.

This is a detailed account of how exactly the disease spread, and who was most affected. Gajdusek provides maps and charts from several years, following the discovery and decline of Kuru. He also describes the culture and living practices of the people in great detail.

Lindenbaum, Shirley. *Kuru Sorcery: Disease and Danger in the New Guinea Highlands*. Palo Alto: Mayfield Pub. Co. ,1979.

Lindenbaum lived among the Fore for two years and remained involved with the Kuru research even after she left. Her book chronicles the way the disease affected the culture, and more specifically, how the Western influence shaped and changed the Fore practices and worldview. She focuses on sorcery as one of the major cultural institutions that affected research on the disease and acceptance of new practices.

Smadel, Joseph E., and D. Carlton Gajdusek. *Correspondence on the Discovery and Original Investigations on Kuru 1955-1958*. US Department of Health, Education, and Welfare: Washington DC, 1976.

This is a collection of letters written to and from Gajdusek during his early research. It primarily documents his correspondence with Joseph Smadel, who did much of the early lab work on Kuru. However, it also contains letters to and from others involved in the research. The letters document the research and confusion of the scientists as they try and initially fail to understand this new disease.

Sorenson, E. Richard, H. J. M. Claessen, Brian M. du Torr, James Griffith, Paul Hockings, Allison Jablonko, R. A. Littlewood, et al. "Socio-Ecological Change among the Fore of New Guinea [and Comments and Replies]." *Current Anthropology* 13, no. 3/4 (Jun. - Oct., 1972): pp. 349-383.

This article describes all of the changes in the Fore culture and lifestyle during the 1960s, based on Sorenson's personal observations. It discusses how the people were involved in an extensive cultural shift toward Western values, economy, and government. It primarily focuses on the effect of the Australian government and the new connections to the Western world rather than the disease itself.

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"Plant Medicines may Cause Diseases." *New Scientist* 2010, no. 9/8/2010 (16, April 1964, 1964): 139.

This is a brief article from an English periodical describing a new theory put forth regarding various diseases outside of Europe and the Americas. It does not mention the researchers in

New Guinea, but provides an interesting picture of how the editors of this magazine viewed the 'uncivilized' Fore people.

Anderson, Warwick. *The Collectors of Lost Souls: Turning Kuru Scientists into Whitemen*. Baltimore: Johns Hopkins University Press, 2008.

Anderson's book focuses on how Kuru's uniqueness drew the interest of all of kinds of American and European scientists, doctors, anthropologists, and other curious parties. He studies their varied reactions upon coming to New Guinea, and how many were forced to revise their opinions of what defined a culture as primitive or civilized. He further looks at how the disease baffled modern scientists and how many, such as Gajdusek, became more personally than scientifically invested in the study.

Spark, Ceridwen. "Learning from the Locals: Gajdusek, Kuru, and Cross-Cultural Interaction in Papua New Guinea." *Health and History* 7, no. 2 (2005): pp. 80-100.

This article is committed to proving the Gajdusek did not go to New Guinea with imperialist intentions or a superiority complex. Based primarily on Gajdusek's journals and writings, it provides a concise, if somewhat biased, view of his intentions and methods. It also offers some explanation for why the Fore so readily accepted Gajdusek's presence and research.

Spink, Wesley William. *Infectious Diseases: Prevention and Treatment in the Nineteenth and Twentieth Centuries*. Minneapolis: University of Minnesota Press. 1978.

A few pages of Spink's book are dedicated to Kuru and describing the science of the disease. While not completely up-to-date, it provides a thorough description of the symptoms and phases of the disease, transmission, and its biological significance.