

datuminternational

101 High Street
Marshfield
Nr Chippenham Wiltshire
SN14 8LT United Kingdom
Telephone +44 (0) 1225 891 426
Telefax +44 (0) 1225 892 092
e-mail datum@gn.apc.org and
james.lewis@member.riba.org



JAMES LEWIS *

This account of volcanic eruption and subsequent evacuation in Tonga was given to James Lewis by Town Officer, Mr Moeake Takai, who kept a diary of events at the time, and to whom the author is deeply indebted. The author also wishes to acknowledge permission granted by the Ministry of Overseas Development and the Government of Tonga for the publication of this article.

The Kingdom of Tonga consists of 169 islands approximately 1000 miles north-east of New Zealand and 400 miles south-east of Fiji in the South Pacific Ocean. The island group extends over an area of 140,000 square miles, but with land area of 289 square miles - very much less than one per cent of the total. Only 36 islands are permanently inhabited, with a total population of 90,000 people, two-thirds of whom live on the principal island of Tongatapu. Natural hazards include tropical cyclone, drought, earthquake, tsunami and volcanic eruption. There are five islands which are active or dormant volcanoes, and two of these are amongst those permanently inhabited. The island of Niua Fo'ou is one of these, situated at the extreme north of the island group, almost 400 miles from Tongatapu and the capital, Nuku'alofa; 105 miles west from Niuatoputapu, the nearest island, and 215 miles north-west from Vava'u, the nearest island sub-group.

Their location at the extreme north of the island group places the islands of Niuatoputapu and Niua Fo'ou roughly mid-way between Fiji and Western Samoa. From the times of the earliest sea voyages, these islands became an important 'halfway house' for ships taking on stores and water. The early Dutch and Spanish explorers made use, or attempted to make use, of these islands in this way, as they had been for at least 1500 years previously by ocean voyagers, not only between two other countries of Fiji and Samoa but between the two civilisations of Micronesia and Polynesia. This strategic location has probably accounted in the past for the comparatively large populations of each of the two islands, as indicated by the ships of the Dutch explorer Le Maire being attacked in 1616 by a thousand men from Niuatoputapu, and later by

'warriors in fourteen canoes' from Niua Fo'ou. In 1946 the population of Niua Fo'ou was 2500. Niuatoputapu is seven square miles in area. Niua Fo'ou is nineteen square miles, including a six square mile lake. Niua Fo'ou is volcanic and rises to 588 feet (see figure one). It has no natural harbour and for many years was called 'Tin Can Mail Island', because mail was dropped from passing ships in sealed tins and retrieved by swimmers.

It would be interesting to know what the effect of earlier eruptions in history have been on its large population, but records have only so far been traced back to 1929 when Niua Fo'ou erupted in July of that year and the village of Futu was destroyed, in addition to many houses and plantations. The need for improved communication was recognised by the Government as a result of this eruption, and a wireless station was established soon afterwards. Eruptions occurred again in 1935 (this time without damage), in 1936 destroying the village of Petani, again in 1943 and then another major eruption occurred in September 1946, and although there was no loss of life, damage was extensive. The wireless station established after the 1929 eruption was destroyed as were other government buildings, dwellings and plantations for the second time seriously during Queen Solote's reign. The decision was made by the Queen and her Government to evacuate the whole population, first to Tongatapu and then to the island of 'Eua.

In 1977, it was the island of 'Eua that suffered greatest damage from the earthquake of June 26th. In the following year, the Government of Tonga requested Technical Assistance in disaster mitigation from the United Kingdom Ministry of Overseas Development, and it was during this assignment that a visit to 'Eua to inspect earthquake damage provided the opportunity to seek out whatever recollection was available of the eruption and evacuation of 1946. Tongans generally are traditional masters of oratory and written documentation, and Mr Moeake Takai, Town Officer at Angaha on 'Eua is no exception. Aged twenty at the time, he had always, and still does, keep a diary, and it was after reference to his diaries that he has described the events of that time.

Darkness falls early in the evenings in Tonga and there was a full moon in the evening of Monday, 9 September 1946. In Angaha, the principal village on the island, there was a brass band practice at the Catholic Mission, and Moeake Takai and his friend John Malekamu went to football practice. At 7.30 pm they felt the first earthquake, then there were two more and a total of probably ten or twelve minor tremors. The fourteen people at band-practice stopped playing and, in fear of an eruption, went to their homes. (Three years previously there had been an eruption on the far side of the island after only one earthquake, and on that occasion people had stayed where they were). Twenty-five minutes later, at five-minutes-to-eight, there was a loud roar from the western side of the village. Moeake Takai ran home and John Malekamu, who was operator at the government wireless station, reported for duty. Moeake Takai's mother and father had left their home and had joined others in climbing up the mountain away from the village on the coastline. He collected his

*Mr Lewis is on the teaching staff at the University of Bath School of Humanities and Social Sciences.

wife and did the same. People were crying and praying, calling to one another and shouting to find one another. There was a great deal of noise. When they had climbed up the mountain, they looked back but their village, the principal village on the island, had all gone. Where it had been was engulfed in black smoke. Climbing the mountain from the village appears to have been an instinctive reaction to escape known likely eruptions nearer the coastline. They were also instructed to do so by the police and the district officer. By eleven o'clock at night 'everyone' was on the mountain, including the district officer, the three police officers and the doctors, but with the exception of the wireless operator. The moonlight shone golden on white steam and on the black smoke. Ministers of all churches were conducting prayers together with the people, government officers, leaders and chiefs. Eventually at about three or four o'clock the eruption ceased, and Moeake Takai went down to look for his friend, the wireless operator. John Malekamu had sent out SOS signals for help and had left the wireless station only when lava was thirty feet away just before its destruction. Exhausted by the intense heat he had run and finally collapsed under a tree, where he was eventually found by his friend. Having realised that whether he lived or not was now 'up to God', he survived and was taken to rejoin the rest of the island community up the mountain. He was able to report to the police the extent of destruction in the village. At sunrise all joined in giving thanks to God for their deliverance - without casualty.

Among the two-and-a-half-thousand people on the mountain sides were four Sisters, one from Belgium, France and Holland, and one from the USA who had with her her national flag which was raised on the highest tree to attract attention. The eruption had commenced on the Monday evening and all the island community were gathered on the mountain sides by or during Tuesday, the following day. They remained there throughout Tuesday, Wednesday and Thursday; and on Friday, 14 September, at ten o'clock in the morning, a plane was heard. A US Navy plane flying from Pango Pango in Samoa to Na'adi in Fiji saw smoke still rising from the island and the waving of clothes on the mountain sides, and reported the situation at Na'adi. A message was sent to the Tonga Government at Nuku'alofa where none of the SOS messages from Niuva Fo'ou itself seemed to have been received. The people remained where they were throughout Friday, and until Tuesday, 18 September when a government ship was at last sighted, one week and a day after the eruption. A cargo ship also arrived on the same day. At 4.30 in the afternoon a Government Officer arrived up the mountain to ask the people to move down again. A meeting was arranged between government officials arrived from Nuku'alofa, the Chief of Niuva Fo'ou who had been in Nuku'alofa, and leaders of the island communities. On the following day a public meeting was arranged, where a government official expressed the need to evacuate the entire population to Tongatapu. The island communities are divided between four chiefs, and when the time came to vote on the issue of whether to agree to government evacuation or not, three Chiefs and their communities of 1800 people voted in favour of evacuation and one Chief and his 700 people voted against evacuation. Tonga has had a democratic form of government since 1875 however, and the majority vote in favour of evacuation meant evacuation for the whole island population of 2500 people.

The date of Saturday, 21 December 1946 was fixed for the commencement of evacuation to Tongatapu. The Police Magistrate from Nuku'alofa remained at Niuva Fo'ou as Chairman of the Evacuation Committee and other officials returned to the capital. Although there was therefore the considerable time of three months to prepare for evacuation, there was on the other hand, a lot of work to be done. All dwellings were to be taken down to permit reuse of building materials, and all material had to be stacked, ready for loading and embarkation.

When the day came, loading began at six o'clock in the morning and continued until five o'clock in the evening. 2500 people and building materials were transported to Nuku'alofa in one day. No animals were permitted to be taken, no food, and no sewing machines - only suitcases for clothing and personal belongings. Each person had been allocated a number, and each number was checked as embarkation progressed. It was an efficiently ordered occasion, but many people were crying and very upset. There had been, in fact, two eruptions, one adjacent to the principal village on land and the other just offshore. The landing place in between these two eruptions had been totally destroyed. Three boats came from Nuku'alofa for the evacuation. One was loaned by the US Government and another, the 'Matua', came from the Union Steamship Company of New Zealand. These two ships had to anchor three-quarters of a mile away from the shore and the third boat, a small wooden craft, the 'Hitofua', was used to ferry all passengers and goods from shore to ship.

Twenty-one men and one woman were left on Niuva Fo'ou to tend crops and what property and belongings remained, but were there only from December to the following April. Life for them must have been particularly difficult, and they were eventually taken off by a Seventh Day Adventist Schooner to Samoa, from where they were eventually taken, still in the charge of the Minister on the boat to Vava'u, but the woman had been taken ill, and she died on board.

Tongatapu was to be only a transit stop. In September 1948 the move began to the island of 'Eua. The distance from Nuku'alofa is only twenty-five miles, but only the contingent of 1800 people who had voted, with their three chiefs, in favour of the evacuation agreed to go on to 'Eua. The other seven hundred, with their chief, stayed in Tongatapu; and in 1959 their requests to return to Niuva Fo'ou were recognised, and the Government agreed to assist their return.

The island of 'Eua, with an area of thirty-four square miles, is one of the largest in the Tongan island group, but even now has only four thousand population, four per cent of the national total. The island is mountainous, rising to just over a thousand feet, naturally forested and with fresh water springs. 'Eua is larger, more fertile, and nearer to the capital than Niuva Fo'ou but the first ten years were a very difficult time for the newly-arrived population. Agricultural land had to be cleared and crops and planting material had to be established. Forest timber, in government ownership, was not freely available and there were few coconut palms available for building. In 1957, a new sawmill was established with New Zealand development aid, and a forestry scheme established under which one quarter of all timber felled on farmed land was

made available to the allotted occupier. This marked a turning point in the island's relative prosperity and standard of living.

But in the intervening ten years, it had probably been severe economic hardship in unfamiliar surroundings that caused seventy-four men to sail to Niua Fo'ou in 1950 to work on copra production. They stayed on the island for one year, then returning to 'Eua, being replaced by another working party in 1951, out of which twenty-four men stayed. In 1952, about twenty men stayed, and again in 1953. Moeake Takai joined one of these working parties and briefly reflected on the moving experience of a return to his native island. Animals had been untethered and freed by the last group of twenty-one to leave in 1947, and had since gone wild. The horses however responded to the long-forgotten sound of water buckets, and allowed themselves to be mounted to join in the work of coconut collection.

There was no permanent settlement on Niua Fo'ou from 1947 until 1959 and all land reverted to Government ownership. It was probably the work of the copra working parties that encouraged the government to assist the permanent return of the contingent from Tongatapu. Copra is the principal export commodity of Tonga as well as the principal cash crop of the majority of islanders. It is understood, however, that, so far, in spite of government assistance for the return of the 'seven hundred' from Tongatapu, land on Niua Fo'ou still has not been allocated by Central Government, under the Tongan tax-allotment system for life tenancy by farmers.

The indications are that the evacuation of 1946 was ad hoc and unplanned, and that the decision to carry it out was precipitate. The apparent lack of forethought about ultimate relocation of evacuees, must have made their plight far more than it need have been and their ultimate resettlement a much longer process than necessary.

Tonga now pays serious attention to the environmental hazards by which her people are afflicted. The recent assessment of measures for disaster mitigation has recommended coordinated and integrated preparedness measures, attention being drawn to the significant aspect of contingency planning for the evacuation of populated active and dormant volcanic islands. Preparedness planning will indicate the need for policy decisions concerning temporary or permanent relocation of communities in a current context of development planning, which recognises the need to reverse or to arrest the spontaneous movement of people from outer islands to urban centres. Infrastructural and administrative development of Niua Fo'ou is planned to provide an airstrip by 1980 and a six bed in-patient ward for the dispensary. The absence of secondary schooling, commented upon in the Third Development Plan, is a significant cause of migration to larger islands. Additional services such as these will reinforce the island's resources in the event of major disaster, but policy decisions for the island concerning local and national disaster preparedness, serving to coordinate and generate infrastructural development, may do more to remove psychological

resistance to living on an extremely remote and hazardous active volcanic island.

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