

# East Asian Voices on Science and the Humanities

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## AMERICAN MISSIONARIES TRANSMITTING SCIENCE IN EARLY TWENTIETH-CENTURY EASTERN TIBET

by Zhao Aidong

*Abstract.* This article is based on the author’s extensive research on the missionaries to Tibet from the Disciples of Christ (Christian Church) USA, and discusses various missionary efforts to transmit scientific and practical knowledge such as medicine, building, and agriculture in Eastern Tibet from 1904–1919. It shows that American missionaries played a prominent and distinctive role in the dissemination of scientific and practical knowledge as a result of their hard work and wisdom. In this sense, they made an important contribution to the development of Tibetan society and the modernization movement in early twentieth-century Eastern Tibet.

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Dr. Albert L. Shelton (1875–1922) and his associates, missionaries from the Disciples of Christ (Christian Church) USA, entered Eastern Tibet (or Khams in Tibetan; see Jeffrey 1975) in 1904. At the same time, the imperial Chinese government began to implement new political and economic policies in the central part of Khams under the administration of Sichuan province, which may be regarded as the beginning of the early modernization movement in ancient Tibetan society. As pioneering Western missionaries in Eastern Tibet, Shelton and his colleagues were more than missionaries. They were also doctors, educators, builders, technicians, farmers, explorers, travelers, mediators, translators, and interpreters. Among the multiple roles they played, their role in transmitting scientific and practical knowledge was prominent. They performed this role in spreading science and technology through various activities—by providing medical treatments for native patients and wounded soldiers, building houses and aqueducts, introducing various crops, compiling textbooks in Tibetan for science education, and so on. Their accomplishments exerted a positive and important impact on the improvement of local people's living conditions and to a certain extent shaped Tibetans' attitude towards the modern world. In this sense, they made a highly distinctive contribution to the early modernization movement in Eastern Tibet. Considering that their activities and role remain under-researched in China and abroad, this article aims to discuss the above-mentioned activities, utilizing as a chief source archival materials written about and by Dr. and Mrs. Shelton and their colleagues. I will attempt to disclose the role of American missionaries in the transmission of scientific and practical knowledge, as well as their contributions to local social development and the modernization movement in early twentieth-century Eastern Tibet.

#### A BRIEF HISTORICAL INTRODUCTION TO EASTERN TIBET OR KHAMS

Tibet is located in an area of plateaus northeast of the Himalayan Mountains in the western portion of the People's Republic of China. As the traditional homeland of the Tibetan people and a few other ethnic groups of China, in ancient times Tibet was naturally divided into three traditional regions, each having distinct geographical and cultural features: Ü-Tsang (covering most of the Tibetan plateau and the central and western portions of both the Tibetan cultural area and the present-day

Tibet Autonomous Region of China, with Lhasa as its capital); Amdo (previously part of Eastern Tibet; now part of Qinghai and Gansu provinces of China, covering a vast area on the northeastern edge of the Tibetan plateau); and Khams (a transliteration of the original Tibetan name, appearing in the forms of Kham or Kam as well). Khams was the heartland of Eastern Tibet, previously Xikang province (1938–1955) and now Ganzi Tibetan Prefecture of Sichuan province, covering an area largely divided between the Tibet Autonomous Region and Sichuan province, with smaller portions located within Qinghai and Yunnan provinces and the Tibet Autonomous Region of China (Zhao and Zhu 2014, 2).

Situated on the eastern and southeastern corner of the Tibetan plateau, Khams is a unique geographical area with several major rivers flowing parallel from north to south and numerous tributaries. People of different ethnic groups have moved and migrated frequently along its valleys over thousands of years. Populations in this region have been “merging and coalescing with little hindrance” (Duncan 1999, 6–7). For this reason, linguists and anthropologists refer to Khams or Eastern Tibet as an “ethnic corridor of southwest China.” The natives of the region are better known as Khampas, some of whom, through intermarriage, were offspring of Tibetans and people of other ethnic groups. The Han immigrants from the Central China plain have inhabited Khams locations for centuries (Zhao and Zhu 2014, 2).

It was not until 1846 that Westerners—two French Catholic missionaries—traveled through the interior of Khams for the first time. Therefore Khams remained unknown to the Western world—in fact, the entire area of Eastern Tibet remained blank on all Western maps until the middle of the nineteenth century. The discovery of Khams created great interest or curiosity in the West. The second half of the nineteenth century witnessed dozens of Westerners traveling and exploring this strange and mysterious land, their new findings bringing back ever more surprises to the Western world (Zhao and Zhu 2014, 2–3; Zhao 2010, 92–104). Then hundreds of Westerners explored the area in the first half of the twentieth century. These explorers were mainly from Britain, France, Russia, Germany, Sweden, Austria-Hungary, Australia, and India. Almost all of them were professionals in various fields—missionaries, explorers, scientists, engineers, hunters, traders, collectors, archaeologists, anthropologists, consuls, soldiers, and spies. Some of them remained in Eastern Tibet for many years. On the whole, these Westerners had an impact on the local society; some of them even had a far-reaching historical impact.

As far as missionaries are concerned, by 1919 the following churches had missionaries stationed in this region. The Catholic missionaries of the Missions Etrangères de Paris (MEP) entered in the middle of the nineteenth century; in 1897 the first group of Protestant missionaries of the China Inland Mission (CIM) set up a station in Tachienlu (present-day Kangding

of Sichuan); and three American missionaries from the Disciples of Christ formed the Tibetan Christian Mission in 1903 and began their activity in Tachienlu in 1904. A couple from the Seventh Day Adventist Church based in the United States went to Tachienlu in 1919 (Zhao 2011, 184–90; Zhao and Zhu 2014, 3). Generally speaking, missionaries played a more important role than other Westerners in spreading science and practical knowledge in early twentieth-century Eastern Tibet.

#### THE EARLY MODERNIZATION MOVEMENT IN KHAMS

Dr. Sharon Watkins describes early twentieth-century Eastern Tibet as “a land of high altitude, rugged terrain, geographical isolation, devout Buddhist tradition, hospitable people and appalling vulnerability to disease” (Zhao and Zhu 2014, v). Before the modernization movement began, Eastern Tibet was a world without modern industries and facilities—no schools, hospitals, post offices, or telecommunications. Monasteries led educational efforts for the purpose of training priests. There were no modern products such as tin cans and bottles (Still 1989, 23). Tachienlu and Batang, two important political and commercial cities in Khams at the time, gained their prominence from the historical Sichuan-Tibetan trade with merchants from various locations in Tibet and neighboring areas “on their way to and from inland China.” An official route also passed through these cities on the way from Chengdu to Lhasa. As an entry to Khams, Tachienlu, located in a valley, was “an ancient city filled with people of many cultures, nationalities, and racial mixtures,” with significant proportions of Tibetan and Han people (Still 1989, 8). Batang, situated in “a long, lush green valley” where two rivers converge, was “a unique, charming place” with a pleasant climate (Still 1989, 23). In the first half of the eighteenth century, the Tibetan Tuses (or Chieftains) in Tachienlu and Batang began to be administered directly under the imperial Chinese government.

The earliest modernization movement in Eastern Tibet was led by the imperial Chinese government. The government came to realize the strategic significance of Khams in the second half of the nineteenth century. In response to the British invasion of Lhasa in 1904, it appointed an assistant Chinese high official (*amban*) named Feng Quan to Khams in 1904. Feng made his headquarters in Batang and began to implement the imperial government’s plan in a reckless way, which resulted in the Tibetan Batang Lamas’ Rebellion of 1905. Lamas burnt down the French mission’s chapel, killing Feng Quan along with other government officials and two French Catholic missionaries in the riot.

In order to develop and bring Khams under strong imperial control, Zhao Erfeng was appointed to Khams to suppress the revolts in Batang and other cities. After he gained control, he began to implement new political and economic policies in Batang in 1906 and in other cities of

Khams in the following years. Zhao's action ended when the last Chinese dynasty collapsed in 1911. Zhao's policies had included reforming the local political system; developing the local economy, transportation, and telecommunications; improving medical and hygiene conditions; establishing education bureaus; and building schools. In terms of medicine and education, Zhao hired Chinese doctors from inland China, providing local residents with medical treatments and vaccination against smallpox. He also opened primary schools and Chinese language schools, offering subjects such as Chinese, Tibetan, arithmetic, reading, writing, history, and so on (Compiling Committee of the Batang County Chronicle 1993, 254–56).

Despite all of the measures and policies implemented by Zhao, Khams still lacked surgical services (because there was no medical science or surgery in traditional Tibetan and Chinese medical practices) (Zhao 2008a, 115–20; science education and practical disciplines (traditional Chinese schools paid little attention to these subjects); and diverse crops (Tibetans used to eat simple food; their main food and drink was *tsamba*, made of barley and buttered tea). To some extent, these deficiencies became an opportunity for the missionaries.

#### PIONEERING AMERICAN MISSIONARIES IN EASTERN TIBET

Coincidentally, the pioneering American missionaries arrived just as the early modernization movement was beginning in Eastern Tibet. The first missionaries stationed in Tachienlu in 1904 were Dr. Rijnhart, who resigned and left in 1906, and Dr. Albert Shelton and his wife Flora Shelton (Zhao 2013, 79). In 1908 Shelton and his associate James Ogden moved their station to Batang where the population was “nearly all Tibetan.” As Ogden reported, “Batang district has for a radius of three days around Batang about 2,500 families, numbering 12,000 to 15,000 people” (quoted in Duncan 1999, 21). In all, eleven Disciples missionaries were sent to Batang by 1919. These missionaries opened a school, a hospital, an orphanage, and a chapel, and built residences for missionary families. They played several important roles in their pioneering work. Their role was especially prominent in introducing science and practical knowledge and skills such as medicine, building, and agriculture. They accomplished this mainly by “doing” rather than just by teaching—through medical treatment, house building, crop planting, and textbook translation and compilation.

There was almost no medical service in early twentieth-century Khams. There was no medical doctor in the Catholic mission, either, though Catholic missionaries did occasionally offer medicines to a very small number of patients. The Sheltons provide some detailed information about the medical situation at the time, along with their personal observations and

experiences. Generally speaking, Eastern Tibet was a land without medical science or the latest scientific methods. Only a few Chinese physicians practiced traditional Chinese medicine in the form of herbal medicine or therapy. Poor Chinese people used to have the solace of opium in severe pain (Flora B. Shelton 1912, 53).

Meanwhile, ordinary Tibetans had little medical knowledge and few remedies, and usually sought help from their religion. Tibetans generally regarded various diseases as “the work of demons” and trusted in their “living Buddhas who could help them through all illnesses” (Flora B. Shelton 1912, 43, 53). For illnesses needing the work of a “more purely medical nature,” Tibetans had their own methods of treatment and seldom sought help from Western medicine. The most common practice was religious rituals that called upon lamas to read prayers, ring bells, blow horns, and beat drums for the patient in order to drive the devils out of his or her body. One local custom in treating patients was never to allow them to sleep; they believed that “if a patient was allowed to go to sleep he may not wake up again” (Flora B. Shelton 1923, 67). Another way of curing diseases was to have the patient swallow a rolled pill, which was a slip of paper with a prayer written by a high priest. As Tibetans were pious Buddhists, the central precept they followed was non-injury to all living creatures. For this reason, no surgical operation was performed in Tibetan medical practice. Their only surgical method might be “to take a knife that has been heated hot and jab it into the affected part” (Flora B. Shelton 1923, 67). Butter, a staple Tibetan food, was often used for various sicknesses and broken bones.

Moreover, Dr. Shelton found that local Tibetans knew little about the scientific way of taking care of patients or their own health. Once he saw some patients suffering from dysentery and lying in the awful stench of dirty things, and no one realized it was important to remove these things (Flora B. Shelton 1923, 46–47; Zhao and Hong 2012, 176–77). Another common problem was lack of awareness of eye protection. Tibetans commonly used yak dung and wood to build fires in their chimney-less houses in Tachienlu and other places. As a result, sore eyes were prevalent (Albert L. Shelton 1921, 48).

Along with superstitions, the lack of medical science made it difficult for many Tibetans and Chinese to understand and accept foreign medicine. For instance, a rumor, which spread widely across China and was also believed by people in Tachienlu, claimed that medical missionaries would catch children and take out their livers and eyes, using them for medicine or food. So, for a long time, whenever small children saw Shelton on the street, they would run away immediately—“never stopped till they were safely inside their own doors” (Flora B. Shelton 1923, 55–56; Zhao 2008a, 120).

## SHELTON'S STRATEGIES FOR HIS PIONEERING MEDICAL WORK

In order to make local people understand Western medicine and accept his services, Shelton spread medical knowledge by “doing,” that is, showing every detail of his actions in his medical work. He adopted the following major strategies.

First, he made whatever he, as a foreign doctor, was doing open to all the local people at all times so that they would see clearly every detail of his actions (Zhao 2008a, 120). His daughter recalled: “From the beginning Father had always allowed patients and relatives to watch what he was doing so they would not be frightened and think he might be using some kind of magic for taking out the soul” (Still 1989, 57). This approach proved rather effective. Mrs. Shelton wrote about a minor operation which had a “magical” impact on Tachienlu Tibetans: “Perhaps the first thing of any importance that brought knowledge of the use of foreign medicine to the Tibetans was the slight operation on the hand of a big lama belonging to one of the lamaseries in Tachienlu” (Flora B. Shelton 1923, 56). The lama had thrust a needle into his hand and it had broken off in his flesh. As he couldn’t get it out, he came to seek help from Shelton. After injecting an anesthetic into the flesh of his hand, Shelton made an incision and quickly extracted the needle. The lama and those spectators around were totally stunned. Shelton later said that the operation “drove another small missionary wedge into this land in the shape of a needle” (Flora B. Shelton 1923, 57). More Tibetans went to see the doctor afterwards.

Upon his arrival in Batang in 1908, Shelton also performed his first operation—the first surgical operation performed in the city’s history—in the open air with dozens of spectators. He was going to remove a series of enlarged glands around a man’s neck. He writes:

There was great curiosity shown by many of the people in Batang when it was found out that I was going to operate on this man. I secured an old door, placed it on two benches out in the open part of the house, where anyone who wished could see. After sterilizing everything as well as could be done, Johnny, my assistant, gave the anesthetic and put the man to sleep, and the operation was performed. Everyone thought the man must be dead as he lay so still and uttered no moan while the operation was being done, and it was with great surprise that they saw him at last wake up. (Albert L. Shelton 1921, 56)

The successful operation was the first vivid lesson for local Tibetans about surgical operations and the power of Western medicine. Shelton stuck to the strategy of always making whatever he was doing visible to the local people. When he took charge of the building of the mission hospital, he even implemented the strategy in the design of the operating room: the entire front was composed of small panes of glass for light; “outside of this glass front was a walkway protected by a rail so anyone who wanted to do

so could watch the doctor operate and see all that was being done, that nothing was being done in secret” (Still 1989, 57; Zhao and Hong 2012, 177–78).

Second, Shelton exercised special care with each case so as to avoid failure. He realized that courage, carefulness, and resourcefulness were fundamental qualities for a pioneering medical missionary in Tibetan territory. Considering the fact that “medical missionaries in China labored in a hard field” in the early twentieth century (Wissing 2004, 147), Shelton and his colleagues labored in an even harder field because of geographical, linguistic, religious, and cultural barriers. In other words, they faced many more and greater challenges from both the natural environment and from the complex local society comprised of Tibetan, Chinese, and other ethnic peoples. He was very clear that each surgical operation he performed would affect his future in the land—whether or not local Tibetans would continue to trust him and whether or not he could stay on there. If he had failed to cure any patient, surely he would have been driven out of Eastern Tibet due to local customs and prejudices (Zhao and Hong 2012, 178). He was once asked by the magistrate to save a Tibetan road worker’s life when his head was hit by a falling rock. Shelton had no other choice but to take risks to perform the operation on the man who was barely breathing and could die at any time. He carefully “removed fourteen pieces of crushed bone, cleaned out the wound thoroughly and stitched back the scalp” and eventually saved the man’s life (Albert L. Shelton 1921, 70). Shelton underwent such difficult experiences time and again, gradually winning the Tibetans’ trust and respect. They were no longer afraid of surgery. Meanwhile, local Chinese and officials also regarded him as a great friend. In this way, a “closed land” had been eventually opened through the medical treatments of Shelton and his associates. Shelton reports that medical work and other branches of mission work “had been continually increasing” since his early surgeries (Albert L. Shelton 1921, 67; Still 1989, 33).

Shelton made many medical trips in Eastern Tibet (Zhao and Hong 2012, 180). In 1909 he made a trip to Shangcheng, where few Westerners had been, and treated more than 280 patients suffering from fractures, cataracts, bad teeth, syphilis, sore eyes, and abscesses, as well as acute problems from rheumatism (Zhao and Hong 2012, 180–81). According to the 1914 Mission report, “Shelton’s areas of itineration stretch from Tachienlu and Dawo on the East, to Jangka and Draya on the West (Inner Tibet) 800 miles; and from Reh En on the North to Atuntze on the South 500 miles apart. . . . Operations went from the amputation of frozen hands and feet to craniotomy and extraction of cataracts” (Duncan 1999, 33–34). He performed a total of 550 treatments and 150 operations on his trip back to Batang through Khams in 1914 (Duncan 1999, 33). Then the Chinese General invited him to Draya where he worked hard for ten days and finally left bandages and dressings with the Chinese doctor “who was



provided with nothing at all” (Albert L. Shelton 1921, 91–94). In 1915, Shelton was invited to travel to Derge with the Chinese army in order to treat wounded soldiers (Wissing 2004, 141; Albert L. Shelton 1921, 109); he also made a three-week trip to Atuntze where there was a great need for medicine (Albert L. Shelton 1921, 104). In 1917, Shelton made five medical trips with the Chinese army in Eastern Tibet, covering “2,000 miles, 52 towns and villages never before visited either by missionaries or white people” (Duncan 1999, 39). He treated about 200 people on his trip to Peheu (Wissing 2004, 141–42). In 1918, Shelton not only succeeded in persuading the Tibetan Governor of Jiangka to work out a truce with the Chinese General during the armed conflict between Khams and Central Tibet but also treated many wounded Tibetan and Chinese soldiers in Jiangka. Then he was invited to Chamdo by the Tibetan Governor of Chamdo and treated a large number of wounded Tibetan and Chinese soldiers injured in battle (Zhao 2008b, 71–79).

#### TIBETANS’ RESPONSE TO WESTERN MEDICINE

How did the Tibetans respond to Shelton’s treatment? On the one hand, although Tibetans were religious believers, it is quite amazing that Western medicine displayed its power and won the Tibetans’ trust so quickly and universally in Batang and neighboring areas. Some even believed in its magic effects to excess. However, most Tibetans only saw the effects of Western medicine without really understanding, while others believed in it while clearly misunderstanding it, which inevitably gave rise to intercultural misunderstanding or conflict (Zhao and Hong 2012, 183–84). As Shelton wrote,

The confidence which the people have in us, engendered by these things, is indeed heart-breaking. They get to believing that we have almost supernatural power and come to us with things which we can in no way help. Hearing what had been done, people come from long distances confidently expecting help, and when told that they cannot be cured, refuse to believe it. They think that we are telling them this so that they will bring money. (Albert L. Shelton 1921, 71–72)

On the other hand, although local Tibetans respected Shelton and appreciated his medical treatments, their feelings for him were not comparable to the holy reverence they felt towards the lamas, their spiritual leaders—high priests or living Buddhas (Zhao and Hong 2012, 184). Shelton had to accept this fact and wrote:

One day I was going down with Ju Lama to his home. His mother is a nomad and lived some two days to the southeast of Batang. As a usual thing, for my medical and surgical ability, I am treated with considerable respect while travelling along the road, but travelling with him I was a person of no consequence whatever. People would see him coming and would line

up along the side of the road, bow their heads and clasp their hands before their faces, and wait for him to ride along and place his hand on one head after another in blessing. (Albert L. Shelton 1921, 67–68)

This narrative suggests that religion, as the core of a culture, does not easily give way to foreign culture or science (Zhao and Hong 2012, 183–84).

#### PRACTICAL KNOWLEDGE AND TECHNIQUES OF HOUSE BUILDING

In Eastern Tibet, traditional houses were mainly adobe houses with walls made of clay. Because they sometimes were built to tremendous heights, they were vulnerable to storms, heavy rains, and earthquakes. When houses collapsed, more than one person would be killed and wounded (Flora B. Shelton 1923, 61–62). Missionaries felt it vital to exert a positive influence on local Tibetans by building houses.

When they began to build the new mission compound in 1915, Shelton and his colleagues followed the recommendations of a CIM missionary who had studied mission problems for years: “With what improvements were able to be introduced, it would be to the people of the place an example and an incentive to improve their houses” (Albert L. Shelton 1921, 97; Zhao and Hong 2012, 182–83). They found that, by adopting a native plan of construction—in the Tibetan style—they could effectively help Tibetans improve the construction of their houses in a scientific way. As Shelton commented:

And so the hospital and the residences are of native construction, that is, the walls are of adobe, built somewhat more substantially than their own and with greater care, so the cracks do not appear. These walls are exceedingly strong and if protected thoroughly from water getting into the top of the wall, will last for untold years. (Albert L. Shelton 1921, 98)

For example, the three-story hospital building was a U-shaped building with an interior courtyard and built of Tibetan-style rammed clay. The only difference of style was its tin roof, which was brought from the United States. As Shelton’s biographer commented, “The medical facility was a near-incomprehensible expression of Western technology wrought on the wildest frontier in central Asia” (Wissing 2004, 146). In other words, “Traveling east the next nearest hospital is twenty-six days; traveling south the next hospital is forty-three days. Going north none is to be found before reaching Siberia; and going west you reach the countries beyond Tibet before there is another” (Wilson 1919, 13–14)

Through their hard work, American missionaries made the hillside called Ja-po-ding, where the mission compound was located, a beautiful place. As described by Mrs. Duncan, “Ja-po-ding was cleared, the property was terraced, fruit and shade trees were set out, gardens were planted,

lawns were beautified with Ky. [Kentucky] bluegrass, flowers, and shrubs, and terraces were planted with grains and alfalfa” (Duncan 1999, 34). More importantly, because of the improvements made both to the Tibetan-style building and to the management of space, the mission compound became a lesson “in sanitation, strength and beauty of the building” with its beautiful surroundings (Duncan 1999, 34). Unfortunately, the mission compound suffered serious damage in the local war, and the Mission was closed due to various reasons in 1932. Nevertheless, the mission compound has become part of the precious local historical memory—Ja-po-ding was ranked first in the rankings of the Historic Sites and Places of Interest of Batang in the Batang County Chronicle compiled by the mayor of Batang in 1942 (Bai 1942, 20).

In addition, in Batang the early American missionaries introduced the technique of burning bricks between 1909 and 1910. In the initial preparation for the mission house construction, Shelton had two kilns built, in which some two hundred thousand bricks had been fired (Albert L. Shelton 1921, 66–67). According to the local oral history we have learned, this was the first time bricks were made and used for houses in Batang.

#### AGRICULTURE

American missionaries introduced and raised about forty different kinds of vegetables, fruits, and other crops before 1919 (Wilson 1919, 14). There were many varieties of vegetables: “Broom corn, sorghum, cabbage, onions, beets, peas, beans, parsnips, carrots, pumpkins, squash, almost anything, in fact, that is produced in America, grows abundantly here” (Albert L. Shelton 1921, 57). Alfalfa seeds brought from Oklahoma grew well, with a harvest once a month, and each missionary family raised about a ton of potatoes annually (Wilson 1919, 14). Meanwhile, they had succeeded in transplanting fruits and nuts such as peaches, pears, apricots, apples, wild raspberries, cantaloupes, English walnut, and strawberries. English walnut was produced in great abundance (Albert L. Shelton 1921, 58). From nine strawberry plants that they brought in, they succeeded in populating the whole valley (Albert L. Shelton 1921, 58; Duncan 1999, 33). They also introduced and cultivated oats.

The first apple trees introduced in 1914 produced an unexpected result. In 1916, the local people began to cultivate more apple trees by taking seeds from the initial trees. Approximately one thousand apple trees grew in Batang, yielding over 20 tons of apples by 1949. According to the report of Dr. Hardy (son of a former missionary in Batang) on his trip to Batang in 1988, among the fruit trees introduced by American missionaries, apples still were found seventy years later to be “one of the major cash crops of the Batang valley” (Duncan 1999, 33). Those apples, known as “Batang apples,” with a sweet taste and lovely appearance, are famous nationwide.

There are up to seventy varieties of apple trees in Batang today (Zhao and Zhu 2014, 97).

#### IRRIGATION

In order to secure a constant water supply for living and for use in gardens, Shelton and his colleagues, with the help of hired workers, dug a 1.3 mile long irrigation ditch around the edge of the mountain, across gullies, and above the cliffs. They had a nearly ten-acre garden under irrigation (Wilson 1919, 14). For part of the irrigation aqueduct, the missionaries had to erect flumes, hollowed-out wooden troughs, to bring water from a place far up the mountainside to the lower ground (Zhao and Zhu 2014, 97). The flumes became examples for local Tibetans, showing how to get water supply across a narrow valley. Further, the owners of the land adjoining the Mission compound made it available with the building of the Mission compound. Those owners raised a common fund and enlarged the ditch dug by the missionaries to about twice its original size, so that it could satisfy the water needs of twenty families (Albert L. Shelton 1921, 97). Therefore, the missionaries contributed to the improvement of some local people's living conditions with their construction in the 1910s. The original ditch built by the missionaries was renovated and expanded three times in 1966, 1981, and 1987 with funds from the Batang county government. Iron flumes have replaced the old wooden troughs. The most recent ditch can now irrigate 500 fields (Zhao and Zhu 2014, 218).

#### INDUSTRIAL EDUCATION AND TRAINING

American missionaries attached much importance to practical disciplines and training. "An early part of the vision of the Mission was for industrial education, particularly for widows and orphans who needed a trade to survive" (Duncan 1999, 24). Industrial classes began soon after missionaries arrived in Tachinelu in 1904. Dr. Rijnhart taught women and children skills to make a living and also trained midwives with other workers (Duncan 1999, 17). In Batang, missionaries introduced some practical skills in the mission kindergarten and school. They gave classes in handiwork, sewing, and crafts "to train children to use their fingers" (Duncan 1999, 24). Minnie Ogden made a great contribution in teaching children sewing, knitting, crocheting, typewriting, garden, and flower growing (Duncan 1999, 37). They also opened a shoe factory in Batang. In 1915 the Mission began to carry out a project called Rug Industrial in Batang "for the purpose of training workers in a self-supporting job and to expose them to the Gospel" (Duncan 1999, 36). Twenty people received wages from the project, including three who were blind and elderly, and five children were trained in 1917 (Duncan 1999, 40).

## SCIENCE EDUCATION

For science education, in the 1910s American missionaries prepared textbooks in the Tibetan language for subjects such as geography and biology. Mrs. Shelton translated several books from English into Tibetan and prepared them for publication by working with her Tibetan teacher. She wrote a textbook entitled *Geography*, “a combined geography and astronomy showing the relations of the earth and the heavenly bodies” (Albert L. Shelton 1921, 125–26; Mrs. A. L. Shelton, 1922b, 1–114). She worked together with her Tibetan teacher and translated it into Tibetan (Albert L. Shelton 1921, 125–26). Another textbook was *A Story Book for Tibetan Boys and Girls: Being Translations of Fairy Stories and Fables Including the Story of Esther*, which contains stories from various world famous stories and fables for children. Among them, two stories contained scientific and practical knowledge about nature and the world: one is a Norse folk tale called “Why the Sea Is Salt” and the other a Russian folk tale “The Flying Ship and Ivan” (Mrs. A. L. Shelton 1922a, x). Later some of these textbooks were published in India. They were used not only in Eastern Tibet, but also in other Tibetan areas. Dr. Shelton commented that they were “greatly needed in the church and school work” (Albert L. Shelton 1921, 125–26).

## CONCLUSION

The American missionary Dr. Albert Shelton and his associates played a prominent role in introducing science and practical knowledge in their pioneering activities in Eastern Tibet or Khams. They spread Western medicine by performing medical treatments on various patients in the places they were stationed and on their numerous trips to different remote places. The mission compound and irrigation ditch that the missionaries built provided extraordinary lessons for local Tibetans to learn about techniques of construction. Among the forty varieties of fruits, vegetables, and other crops they introduced and planted, apple trees have been flourishing for a century; Batang has been famous for its “Batang apples” for decades. Training projects were undertaken for the purpose of helping the poor, disabled people, women, and children acquire practical skills. The textbooks in Tibetan that the missionaries prepared for science education were unique to Tibetan children and Christians at that time. In conclusion, the American missionaries from the Disciples of Christ made a unique and great contribution to the development of local Tibetan society and the early modernization movement with their hard work and wisdom in transmitting scientific and practical knowledge in early twentieth-century Eastern Tibet. Their work has had a far-reaching impact on modern Tibetan history, and much of that impact remains today.

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## REFERENCES

- Bai Shangwen. 1942. *The Batang County Chronicle* [in Tibetan]. Batang, China: Shangwen Bai. Compiling Committee of the Batang County Chronicle. 1993. *The Batang County Chronicle* [in Chinese]. Chengdu, China: Sichuan Minzu.
- Duncan, Marian L. 1999. *A Flame of the Fire: The Batang Tibetan Mission of the Disciples of Christ Missions*. Spring Hill, TN: Marian L. Duncan.
- Jeffrey, J. H. 1975. *Khams or Eastern Tibet*. London: Arthur H. Stockwell.
- Shelton, Albert L. 1921. *Pioneering in Tibet: A Personal Record of Life and Experience in Mission Fields*. New York: Fleming H. Revell.
- Shelton, Mrs. A. L. 1922a. *A Story Book for Tibetan Boys and Girls: Being Translations of Fairy Stories and Fables Including the Story of Esther*. Calcutta: Baptist Mission Press (arranged in Tibetan by Gezong Ongdu).
- . 1922b. *Geography: Containing a Few Simple Facts about Nature and the World, for Tibetans*. Calcutta: Baptist Mission Press (arranged in Tibetan by Gezong Ongdu).
- Shelton, Flora B. 1912. *Sunshine and Shadow on the Tibetan Border*. Cincinnati, OH: Foreign Christian Missionary Society.
- . 1923. *Shelton of Tibet*. New York: George H. Doran.
- Still, Dorris Shelton. 1989. *Beyond the Devils in the Wind*. Tempe, AZ: Synergy Books.
- Wilson, Bert. 1919. “Shelton of Batang.” *World Call* 6: 10–15.
- Wissing, Douglas. 2004. *Pioneer in Tibet: The Life and Perils of Dr. Albert Shelton*. New York: Palgrave Macmillan.
- Zhao Aidong. 2008a. “On the Medical Activities of American Missionary Shelton in Tachienlu of Eastern Tibet in the Early 20th Century” [in Chinese]. *China Tibetology* 3: 115–20.
- . 2008b. “On the Activities and Roles of American Missionary Shelton during the 1917–1918 Conflict between Kham and Tibet” [in Chinese]. *Tibetan Studies* 6: 71–79.

- . 2010. “On the Englishman Cooper’s Exploration in Khams and Britain’s Aggressive Desires against China’s Southwest Frontiers in the 19th Century” [in Chinese]. *China’s Borderland History and Geography Studies* 4: 92–102.
- . 2011. “On the Activities of Missionaries in Eastern Tibet: 1846–1919” [in Chinese]. *Guizhou Ethnic Studies* 5: 184–90.
- . 2013. “North Americans Traveling and Living in Eastern Tibet before 1919 and Sino-Western Cultural Exchange: Focusing on the Influence of Their Writings in the West” [in Chinese]. *Journal of Tibet University* 2: 77–83.
- Zhao Aidong and Hong QuanHu. 2012. “On the Medical Activities of the American Missionary Shelton and His Interaction with Eastern Tibet” [in Chinese]. *Journal of Tibetology* 7: 175–84.
- Zhao Aidong and Zhu Xiaoling. 2014. *Far, Far Away in Remote Eastern Tibet: The Story of the American Doctor Albert Shelton and His Colleagues from the Disciples of Christ 1903–1950*. St. Louis, MO: Lucas Park Books.