

# Invisible Enemies: Ranching, Farming, and Quechan Indian Deaths at the Fort Yuma Agency, California, 1915-1925

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The Colorado River weaves its course like a snake, moving south through the desert along the present-day borders of California and Arizona. Just north of the communities of Yuma and Winterhaven, the river turns abruptly west and flows toward a solitary and rocky mountain called Pilot Knob. The river swings south at a right angle, cutting a natural border between Baja California and Arizona, and continues its journey to the Sea of Cortez. Since the time of emergence when Kwikummat created the earth and Kumastamxo put the world into motion, this region of southeastern California has been the home of Quechan Indians.<sup>1</sup> In the 1770s and 1780s, their lives were interrupted briefly by two expeditions of Captain Juan Bautista de Anza, the missionizing activities of Fray Francisco Garcés, and the civil settlement of Alférez Santiago de Islas.<sup>2</sup> The Quechan rose in a rebellion to expel Spanish soldiers, settlers, and missionaries, and after the 1780s Spain's agents never

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returned to resettle among the Quechan. The Indians were affected far more adversely by soldiers, settlers, miners, ranchers, farmers, and agents from the United States. Much has been written about the impact of the white invasion of Quechan in the nineteenth century in terms of war, land, and sovereignty, but little is available regarding the ill effects of the reservation on Native health or the relationship of non-Indian ranching and farming on Quechans in the early twentieth century.<sup>3</sup>

The fate of the Quechan in the first quarter of the twentieth century was intimately tied to biological, environmental, geographical, and economic changes brought by non-Indians to the region of the lower Colorado River. Chief among these changes was the introduction of new and virulent pathogens. Non-Indians also introduced livestock, gold mining, new technologies, numerous transportation systems, and irrigated farming. Non-Indians diverted water away from Quechan crops to those cultivated by white farmers, including those in the Bard Area on former reservation lands. There is no doubt that deaths among Quechan people in the early twentieth century were tied to the reservation system, which forced many bands of Indians onto a single and smaller land base where the people lived in close proximity to each other without basic knowledge regarding sanitation, public health, and bacterial-borne diseases.

In the late nineteenth and early twentieth centuries, the germ theory and public health movement were in their infancies, and some medical and public officials doubted the existence of bacillus or the need for public health. The Quechan knew little or nothing about bacterial and viral forms of infection and were ill prepared to fight the invisible enemies that invaded their homes in the early twentieth century. Agents working for the Office of Indian Affairs at Fort Yuma exhibited little interest in providing Indians with health education and knowledge to enable them to detect tuberculosis, isolate people with the disease, and help prevent the spread of it and other maladies. The lack of health education about bacteria and viruses in the early twentieth century made the Quechan population easy prey for a variety of pathogens. "Specific microorganisms come in various differentially virulent strains," writes S. Ryan Johansson. "But the more virulent strains within any population of microorganisms cannot survive and perpetuate themselves unless they have an abundant supply of available hosts."<sup>4</sup> In the early twentieth century, Native American populations in

general, and the Quechan in particular, became the preferred hosts for the tubercle bacillus introduced into Quechan culture by non-Indians.

The prevalence of pathogens and infection of individuals by bacillus and viruses caused the diseases that killed Quechan people, but environmental conditions contributed to making the population vulnerable to disease. Disease and death on the Fort Yuma Reservation were tied to poor, overcrowded housing where bacillus and viruses multiplied and spread rapidly through the air, dust, and shared material items such as cups, blankets, clothing, and bandages. In addition, consumptives from the eastern part of the United States and other countries moved to the Southwest desert in search of ideal environments to cure their disease. They introduced large concentrations of bacillus that spread among Native Americans. All of these factors were part of a disease culture in which sickness and death spread indiscriminately among Quechan men, women, and children. Another factor that contributed to the susceptibility of Quechan people to disease was the destruction of their native foods and cultivated crops in the 1890s and 1910s. However, as Johansson points out, "[I]t is hard to pinpoint chronic malnutrition as the only possible cause of differential mortality related to... tuberculosis" or other bacterial diseases.<sup>5</sup> Using the work of Samuel Preston, Johansson argues that "in statistical terms income (and, by extension, nutrition) could not have been major determinants of mortality."<sup>6</sup> Wesley W. Spink disagrees, stating that "[A] poor state of nutrition leads to more severe infections, and infection accentuates an already compromised nutritional state."<sup>7</sup> F.B. Smith states that recent studies suggest "that protein calorie malnutrition can reduce an individual's cell-mediated immunity" and "that improving nutrition contributed fundamentally" to the retreat of disease. Therefore, if a nutritious diet of fish, meat, and grains contributed to the "retreat" of disease, then, conversely, the absence of nutritious foods might contribute to a person's susceptibility to some diseases.<sup>8</sup> No attempt is made here to argue that food and nutrition were the only factors or the most significant factors at work among the Quechan—rather, that food and nutrition are among the many complex circumstances which led to a high mortality rate resulting from infectious diseases and malnutrition among the people.

None of these scholars have examined Native American populations to consider the correlation between the destruc-

tion of native foods in the late nineteenth and early twentieth centuries and high death rates resulting from selected diseases or high infant mortality rates among American Indians. While there can be no doubt that the Quechan and other Native Americans contracted diseases as a result of high levels of exposure to pathogens, it is important to consider that "disease theory is so complex, the role of nutrition theory in it cannot be discounted."<sup>9</sup> But the role of food and nutrition as a factor in the historical study of disease and death among the Quechan is but one of many factors arising out the reservation system, including non-Indian resettlement of the lower Colorado River and economic development of the region. However, it is worthy of examination, particularly in terms of predisposing the population to tuberculosis, pneumonia, and gastrointestinal disorders.

The historical evolution of Quechan contact with non-Indians from the United States is germane to the discussion. Bands of Quechan were some of the first of California's Indians to deal with American soldiers and surveyors in the 1840s—during and after the war with Mexico. In 1851 and 1852 the Quechans watched as Major Samuel P. Heintzelman and troops of the United States Army built Fort Yuma on a rocky knoll overlooking the confluence of the Gila and Colorado rivers. Some bands of Quechans fought bluecoat soldiers in a series of skirmishes in the river valleys, but they concluded a peace with Major Heintzelman in September 1852 at a "Great Council" held at Chief Hutt-y-me-neis camp not far from Chimney Rock (Picacho). Between 1852 and 1883, some Quechan lands were included in a military reservation controlled by the United States Army—not by the Office of Indian Affairs—including a strip of land on the Arizona side of the Colorado River used as the Army's Quartermaster's Depot.<sup>10</sup>

In 1884 the Quechans secured only a small portion of their former landed estate when President Chester A. Arthur issued an executive order creating the Fort Yuma Indian Reservation. The document established a legal relationship between the tribe and the government. As a result of this document, the Quechans lost thousands of acres of their former domain, rich farm lands, and lucrative water resources. By the 1880s Quechan people had already witnessed a myriad of changes in their land. The California Gold Rush had ushered in a new era of contact with non-Indians from Mexico and the United States. Ferries, steamboats, roads, stagecoaches, and railroads offered new modes of transportation to and through the region which

encouraged non-Indians to travel through or resettle lands of the Quechan. Non-Indians built the town of Colorado City on the Arizona side of the Colorado River, a community renamed Arizona City and, later, Yuma. The small town grew as a result of its close proximity to the Yuma Crossing and Fort Yuma, expanding onto lands on both sides of the Colorado and Gila rivers that were once the sole domain of the Quechan.<sup>11</sup>

The economic development of ranching, farming, and mining brought more non-Indians to the region who resettled former Indian lands and cleared thousands of acres that contained plants and animals important for food and medicine to Native people. With all of the newcomers came viruses and bacillus that infected Quechan people with influenza, fevers, measles (*xemalyus anakor*), and smallpox (*xemalyus vatatc*).<sup>12</sup> Deaths resulting from these diseases were noted in official reports, but neither the Army nor agents of the Fort Yuma Agency kept detailed vital statistics of Quechan deaths until 1915. Thus, the government of the United States kept no accurate data regarding births and deaths among the Quechan until this date, but it is reasonable to state that the overall health of the Quechan in the late nineteenth and early twentieth centuries was tied to factors out of the control of Indians—that is, the growth of the non-Indian population, the economic development of the region through ranching-farming, and oppressive policies of the Office of Indian Affairs.<sup>13</sup>

The continued deterioration of health among the Quechans in the early twentieth century was related to open grazing of horses, cattle, and burros. Spaniards first introduced livestock to the region in the 1770s and 1780s with the settlement of two missions and two villages in the region. In 1781 the Quechan rose in a rebellion against the Spanish, forcing them to leave Quechan lands without attempting to reestablish Mission La Purisima de la Concepción or Mission San Pablo y San Pedro de Bicuñer. Undoubtedly, some of the horses and cattle brought by these first Spanish settlers remained in the region, but it is likely that even more escaped as Spanish and Mexican ranchers drove cattle, horses, and sheep across the Colorado River on their way to Alta California.<sup>14</sup> Still, far more animals ranged the region of the lower Colorado River after 1848 when the Treaty of Guadalupe Hidalgo split the region from Mexico.

American and Mexican surveyors, soldiers, and miners moved through the region in the 1840s and 1850s, bringing with them numerous animals. However, with the establish-

ment of Fort Yuma in 1851 came herds of livestock used to transport and feed the soldiers. Government and private herds grazed along the Colorado and Gila rivers, eating foods normally gathered by the Quechan. Horses, cattle, mules, burros, hogs, goats, and sheep ate forms of edible grass seeds or grains called *akyirc*, *akwa'v*, *anki'*, *kwiskwa'k*, *sukwato'c*, and *atpi'l*. Livestock also ate *eya'* (mesquite), *i'i'c* (screw beans), *axpa'lk* (ironwood nuts), *ata'lk* (potato-like root), *iou't* (spring fungus), and *av'a'* (sagebrush seeds).<sup>15</sup>

Equally important, livestock owned by Euro-Americans consumed cultivated crops grown by Quechan farmers, including many varieties of corn, beans, pumpkins, and melons. The Quechan planted and harvested these crops before the arrival of the Spanish, and they frightened rabbits, deer, crows, and other animals away from their gardens by devising noise-and motion-makers. Youngsters and elders guarded some fields to chase away raccoons and coyotes, and families sometimes resided close to their gardens where they protected plants from animals.<sup>16</sup> However, the arrival of European livestock brought greater destruction to their unfenced gardens, and non-Indian settlers protected their livestock from angry Indian farmers whose lands and crops had been violated. Settlers did not want Indians harassing their animals, and they sometimes encouraged the destruction of Indian gardens by domesticated animals in order to encourage Native farmers to leave their cleared and productive lands.

The first Spanish explorers to visit the Quechan recorded the fact that the Indians irrigated their fields through natural flooding of the Colorado and Gila rivers. Normally the rivers rose and fell in February and May in most years, and the Quechan used this time to clear and cultivate the rich bottom lands so that they could plant their crops. The natural irrigation system of the Quechan made the soil productive, and they planted crops throughout the desert spring and summer from February through June.<sup>17</sup> According to Father Tomás Eixarch, "[t]he land is so good that only with the bathing given it by the river during the time of its flood it conserves enough moisture so that it produces wheat and also maize, beans, watermelons, calabashes, etc...."<sup>18</sup> Major Heintzelman reported that "With an old axe (if they are so fortunate as to possess one), knives and fire, a spot likely to overflow is cleared. After the waters subside, small holes are dug at proper intervals a few inches deep with a sharpened stick, having first removed the surface for an inch or

two as it is apt to cake.”<sup>19</sup> Quechan women planted seeds into the earth which had captured and retained its moisture from the flooding river. In this way, the Quechans depended on the annual flooding of the river for a portion of their livelihood. The Indians followed this ancient form of agriculture until the turn of the twentieth century when non-Indians began diverting water from the Colorado River for irrigation projects.

This dramatic environmental change was acknowledged by noted ethnologist C. Daryll Forde in his classic, *Ethnography of the Yuma Indians*, when he stated: “The construction works for the irrigation of the Imperial valley and of a section in southwestern Arizona have modified the flood conditions of the Colorado below Laguna Dam, twelve miles above Fort Yuma.”<sup>20</sup> Actually the change had started in 1874 when three ranchers settled in the broad and rich Yuma Valley on the east bank of the Colorado River between Yuma and present-day San Luis. Other ranchers and farmers moved up the Colorado River above the Fort Yuma agency, while others settled east of Yuma along the Gila River Valley. However, the largest concentration of agricultural development occurred in the Yuma Valley. Between 1875 and 1890, more ranchers moved into the Yuma Valley to farm, and with them came a demand for water. The key to successful farming in the region was water, and within two decades, non-Indians would seize control of the water in the region of the lower Colorado River. Several entrepreneurs began diverting water from the river and pumping it through canals to fertile fields. During the 1890s, the Yuma Pump Irrigation, Colorado River Pump Irrigation, Rollins and Sons, State of Arizona Improvement, and Yuma Valley Union Land and Water companies were among those operating in the Yuma Valley.<sup>21</sup>

At first the irrigation projects depended solely on private investment, but in 1902 the United States Congress passed the Reclamation Act and began making plans to divert water to the Imperial and Yuma valleys and to build Laguna Dam just above Yuma, adjacent to the Fort Yuma Reservation.<sup>22</sup> Construction on the dam began in May 1905 and was completed in March 1909.<sup>23</sup> It was built to divert water from the river into a canal that would run downstream on the California side of the Colorado River. Directly west of Fort Yuma Hill, the water would travel through a huge siphon built underneath the river, taking the water from California to Arizona. Then through a series of canals, the water moved into the Yuma Valley to

irrigate thousands of acres of non-Indian lands. Laguna Dam, the siphon, canal systems, and pumping stations were major engineering feats and a big boon for non-Indians living in the region.<sup>24</sup> Diversion of water from the Colorado River meant more farms, roads, canals, schools, and homes. New communities emerged including Somerton (1909) and Gadsden (1914) in Arizona, and Bard (1909) and Winterhaven (1914) in California.<sup>25</sup> More people moved into the region, and increased agriculture meant more crops, jobs, social events, and economic opportunities. It also meant the destruction of more plant and animal habitats and the diversion of more water away from the Indians.<sup>26</sup>

Agriculture spread to the sandy mesas surrounding Yuma where water turned the tan earth into fertile farms. As early as 1894, non-Indian farmers planted 102 acres of lemons, 10 acres of oranges, 30 acres of apricots, 20 acres of peaches, 50 acres of table grapes, 80 acres of alfalfa, and 10 acres of garden vegetables.<sup>27</sup> However, the development of the Yuma Mesa did not blossom fully until 1922 when Benjamin Franklin Fly and the Mesa Farmers organized formally. Their main crop was citrus, but like all other crops, their venture depended on water diverted from the Colorado River to the mesa.<sup>28</sup> At the same time, as farming expanded onto the Yuma Mesa, farmers in the Dome, Welton, and Antelope valleys east of Yuma diverted water from the Gila River into the fields. Thus the course and flow of the Gila and Colorado rivers changed forever as a result of non-Indian farming.<sup>29</sup>

The growth and development of agriculture in the river valleys surrounding Yuma, Arizona, were heralded by non-Indians as the blooming of the West. Produce grown in the desert enriched the diets and lives of people throughout the world. It was a glorious day in 1909 when the United States government completed construction of Laguna Dam and for sixty-five cents people could ride a Southern Pacific train along a portion of the canal that led to the dam site.<sup>30</sup> With green and gold banners flying and hundreds of people wearing buttons, non-Indians celebrated July 4, 1911 by watching water flow through the siphon on its way to the Yuma Valley.<sup>31</sup> Many varieties of crops were grown using this water, but cotton became king in the region. Farmers, investors, and bankers built cotton gins to process the crops. On January 13, 1924, the *Yuma Morning Sun* reported that cotton gins in Yuma had produced 6,898 bales of cotton, while those in Somerton and Gadsden

had processed 4,515 and 1,892 respectively, totaling 13,405 bales in 1923 alone.<sup>32</sup> By any measure, farming had changed the economy, geography, and environment of the lower Colorado River region. While the reclamation projects proved so beneficial to non-Indians along the river and to people around the world who consumed the crops, it had come at a high cost to the Native people of the region. This fact was never recognized in the newspapers, county supervisors' reports, superior court records, or other documents from the region.<sup>33</sup>

Farming and ranching in parts of California and Arizona, built on water from the Colorado River, harmed the livelihood of Quechan Indians. Non-Indian livestock grazed on the natural foods of the Indians and generally interfered with their natural environment. Animal and bird habitats changed as a result of reclamation projects. Most significant, the diversion of water from the Colorado and Gila rivers altered the annual floods that had irrigated Quechan farms, and without the water Quechan people could no longer grow their corn, beans, and melons. Government rations to Indians, always meager, declined between 1914 and 1918 because of World War I, and after the war the government generally issued canned army rations to the Indians which were not as nutritious as the fresh fruits and vegetables formerly eaten by the Quechan. As a result of the decline of fats, proteins, and carbohydrates—food sources high in nutritious vitamins and minerals—the bodies of Quechan men, women, and children deteriorated. At the same time, the Quechan population faced a cultural and social anomie as a result of white rule of their homelands. Serious social depression and the lack of nutritious foods made the people more susceptible to disease and death.<sup>34</sup>

It is well established in the medical literature that the lack of wholesome foods and good nutrition is related to health and disease. Malnourished people were vulnerable to attacks by invading bacillus. That is not to say that poor nutrition caused the leading killers on the Fort Yuma Reservation, including tuberculosis, pneumonia, and gastrointestinal disorders. Bacteria caused these diseases most of the time, although there are viral forms of pneumonia and gastrointestinal disorders. No doubt that poor public health and inadequate sanitation contributed greatly to the onset and spread of diseases. However, "environmental influences which modify the manner in which the body responds to infection" are important factors in the progress of these diseases.<sup>35</sup> This factor was well

known to nurses who worked with tubercular patients. "I felt convinced," wrote Grace Forman, who worked with fifty different patients with tuberculosis, "that in thirty-eight of these [cases] deficient nourishment was the predisposing cause." M. Adelaide Nutting, another nurse, interviewed her colleagues regarding the most important predisposing factor regarding tuberculosis. All of her respondents agreed: "Poor food, poor in quality, in quantity, and, worse still, the way in which it was cooked."<sup>36</sup>

In terms of tuberculosis and pneumonia, depression, fatigue, poor housing, inadequate public health, and insufficient nutrition are all factors that influence the course of these diseases. As William Osler once pointed out, "It is just as important to know what is in a man's head as what is in his chest."<sup>37</sup> It is impossible to quantify the degree to which chronic mental depression made Quechan individuals susceptible to disease, but there is no doubt that Native Americans living in the American West during the early twentieth century were generally depressed about the rapid and dramatic turn of events in their worlds as a result of white contact. One of the most important events in Quechan Indian history was the damming of the Colorado River and the diversion of millions of acre feet of water from Quechan country.

Initially, non-Indians diverted water into the Yuma Valley, but soon they sent water to farmers on the Yuma Mesa, Bard Valley, and Imperial Valley. Water diversion from the Colorado and Gila rivers after 1900 made it more difficult and most often impossible for the river to overflow its banks and irrigate Indian farmlands naturally. There is no way to quantify the effects of the reclamation projects on the amount of food that the Indians lost as a result of non-Indian farming and ranching. However, the decline of food among any population "is associated with increased susceptibility" to diseases because the lack of food, particularly foods familiar in a peoples' diet, makes the population a perfect host for prevailing bacillus. During the decade between 1915 and 1925, tuberculosis, pneumonia, and gastrointestinal disorders thrived among the Quechan, infecting and killing people. The lack of food, especially nutritious food, became commonplace during the decade. Several people died from malnutrition and many more suffered from it—particularly children.

In accordance with an act of Congress in 1884, the Office of Indian Affairs was required to keep vital statistics for every

Indian reservation. Unfortunately, most agency officials did not initiate the task until the early twentieth century, complaining in 1888 that the collection of vital statistics was labor intensive and difficult owing to large geographical areas with few roads, mobile Native populations, illiterate census takers, and the cost of interpreters.<sup>38</sup> Although few of these complaints applied to the Fort Yuma agency, officials recorded Registers of Vital Statistics only for those years between 1915 and 1925.<sup>39</sup> These documents are preserved in the National Archives, Pacific Southwest Region, at Laguna Niguel, and an analysis of these limited sources is revealing. Between 1915 and 1925, the documents indicate that a total of 245 deaths occurred on the Fort Yuma Reservation (Table 1). This number includes deaths occurring during six-month periods in 1915 and 1925. Officials recorded a cause of death for 189 (77 percent) people during the decade, and all percentages relating to cause of death are calculated on this number. Of the 245 people who died on the reservation, officials recording the death registers reveal the age of 226 (92 percent) individuals. The Registers of Vital Statistics for the Fort Yuma Agency, 1915-1925, are fairly complete records which provide a brief window through which to study disease and death among the Quechan Indians in the early twentieth century (Table 2).<sup>40</sup>

The modal year of death during the decade between 1915 and 1925 was 1923 when the Quechan suffered 36 (14.7 percent) deaths (Table 1). The modal age group among these Indians during the decade was that between the ages of 0-4 (Table 2). This age group suffered 73 (32.3 percent) of the deaths, far more than the next leading age group of those people who were 80 years or older who lost 17 (7.5 percent) people. Clearly, infants and children suffered far more deaths than any other age group, a circumstance common among third-world nations. The Quechans, as well as most Native Americans in the early twentieth century, lived in poverty and disease in spite of efforts like those of Commissioner of Indian Affairs Robert G. Valentine who wrote in 1909 that there was no use "deceiving ourselves with hopes of the future, if we are allowing tuberculosis and all rotten diseases of the blood to creep among these people."<sup>41</sup> Equally important, a total of 42 (57.5 percent) of those deaths within the age group of 0-4 were infants under the age of 1 (Table 3). This was a singular situation, given the fact that Elsie Newton, head of the Office of Indian Affairs' Field Matrons, pointed out in 1915 that the Fort

Yuma Agency was one of the four leading reservations in the country where programs to familiarize mothers with infant care, sanitation, and feeding techniques had been successful. If the Fort Yuma Agency was a model reservation for the program, other reservations were in the depths of despair. Infants on the Fort Yuma Reservation died of a few major causes but primarily of malnutrition.<sup>42</sup>

In his path-breaking book, *Crosscurrents Along the Colorado: The Impact of Government Policy on Quechan Indians*, Robert L. Bee provides many insights that directly and indirectly affected malnutrition and disease on the Fort Yuma Reservation. Bee argues that between 1900 and 1914, "Indian agents wielded the political authority while powerless Quechan factions split, merged, split again, making united fronts of opposition or support."<sup>43</sup> Quechan divisions created internal strifes which affected the mental, physical, and spiritual health of the people, although it is impossible to measure the degree to which these factors influenced disease and death. Agents dictated land policies, withdrew support for farming loans to Indians, leased native land to non-Indians, allowed the Bureau of Reclamation to control portions of Indian land, and allotted the native estate—all of which deprived Indians of hundreds of acres of their former territory. In addition, agents kidnapped children and forced them into an outing program whereby they had to work as domestics and ranch hands in Yuma, Winterhaven, and Bard for white families so they could become "civilized." As a result of the reservation system, Quechans lost land, foods, and children. They lost elements of their identity and dignity through government oppression. Quechan leader Joseph Miguel complained to agent H.B. Jolley that while Quechan farmers planted their crops and waited for the harvest, families starved. He believed that the government should "supply the Indians with plenty to eat and to support their families while the crops were growing." The lack of food was a significant problem among the Quechan in the early twentieth century, which led to depression and malnutrition.<sup>44</sup>

Malnutrition was a leading killer of Quechan infants between 1915 and 1925, taking the lives of 11 (35 percent of known causes of infant deaths), including 6 males and 5 females. The number of infants and children under 3 years of age dying from malnutrition totaled 13 (7 percent of all deaths), and these statistics indicate the degree to which Quechan adults and children suffered from the lack of food and poor

nutrition (Table 7). The fact that malnutrition was the foremost cause of death among infants suggests that between 1915 and 1925 the Quechan population had an inadequate diet of native grains and vegetables as well as cultivated crops. And even if their diet was supplemented with government rations, the Quechans may not have been able to digest these new and refined foods and biologically take from them necessary amounts of nutritional value. Significantly, if rations were provided, they were not of sufficient quality and quantity to prevent starvation. The decline of foodstuff among the Quechan is evident in the amount of malnutrition suffered by the people, and Quechan infants and children died as a result.

In addition to malnutrition, Quechans died of other diseases linked to food. A total of 5 (16 percent) Quechan infants died of gastrointestinal disorders, 4 (13 percent) of pneumonia, and 4 (13 percent) of tuberculosis. Bacterial infections were the cause of most of these infant deaths, but the lack of food and nutrition were certainly contributing factors that weakened the children to such an extent that they became susceptible to diseases. During the decade under study, the Quechans suffered high infant mortality rates in comparison to other populations in the United States in the years 1918, 1919, 1921, 1923, and 1924 (Tables 4 and 5). The year of 1923 witnessed the highest infant mortality rate among the Quechans during the decade: 539 per 1,000 live births in the population, in comparison to whites in the United States whose rate was 74 and non-whites whose rate was 117 (Tables 4 and 5). In order to even out the data, moving averages of infant mortality rates were employed for the period between 1915 and 1925 among Quechans, whites, and non-whites. These suggest that Quechans generally had higher infant mortality rates throughout most of the decade (Table 6). During this era, the Quechan population averaged approximately 840 and was extremely small in comparison to whites and non-whites in the United States. Still, the comparisons suggest that the Indians had an infant mortality rate greater than other populations during most of the decade.

Within the entire Quechan population, tuberculosis was the major cause of death. Traditional Quechan medicine people had difficulty dealing with the dangerous disease, but one man recorded that he had acquired the ability to combat tuberculosis. In powerful dreams this man traveled to the sacred mountain of *Avekwame* to meet Kumastamxo who empowered the doctor to treat consumptive patients. "You are a consumption

**TABLE 1**  
**Year and Number of Deaths**  
**Fort Yuma Indian Agency, 1915-1925**

YEAR	NUMBER	PERCENT
1915*	7	2.9
1916	15	6.1
1917	25	10.2
1918	31	12.6
1919	34	13.9
1920	24	9.8
1921	16	6.5
1922	19	7.8
1923	36	14.7
1924	26	10.6
1925*	12	4.9
	245	100

\*Indicates years in which only six months were reported during the fiscal year. Between 1915 and 1925, the Registers of Vital Statistics for Fort Yuma Agency revealed a total of 245 deaths of which the cause of 56 deaths was unknown.

Source: Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75.

**TABLE 2**  
**Age at Death and Number of Deaths**  
**Fort Yuma Indian Agency, 1915-1925**

AGE	NUMBER	PERCENT
0-4	73	32.3
5-9	6	2.7
10-14	4	1.8
15-19	12	5.3
20-24	11	4.9
25-29	16	7.0
30-34	16	7.0
35-39	6	2.7
40-44	10	4.4
45-49	9	4.0
50-54	12	5.3
55-59	7	3.0
60-64	9	4.0
65-69	9	4.0
70-74	6	2.7
75-79	3	1.3
80+	17	7.5
	226	

Between 1915 and 1925, the Registers of Vital Statistics reveal the age of 226 individuals but did not disclose the ages of 19 others.

Source: Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75.

**TABLE 3**  
**Sex and Leading Causes of Infant Deaths**  
**Fort Yuma Indian Agency, 1915-1925**

CAUSE	MALE	FEMALE	TOTAL
Malnutrition	6	5	11 (35%)
Gastrointestinal	1	4	5 (16%)
Pneumonia	3	1	4 (13%)
Tuberculosis	1	3	4 (13%)
Total	11	13	24 (77%)

The Registers of Vital Statistics indicate that between 1915 and 1925, 42 or 17% of the total 245 deaths on the reservation were those of infants. During the same era, 57.5% of all deaths occurred among children ages 0-4. The percentages above are based on 31 known causes of death.

Source: Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75.

**TABLE 4**  
**Infant Births, Deaths, and Mortality Rates**  
**Quechan Indians, 1915-1925**  
**(Rates per 1000 Live Births)**

<b>Year</b>	<b>Deaths/Births</b>	<b>Infant Mortality Rate</b>
1915	1/21	48
1916	3/19	158
1917	0/30	NA
1918	5/15	333
1919	5/14	357
1920	3/34	88
1921	6/17	353
1922	1/27	37
1923	9/17	529
1924	6/24	250
1925	0/8	NA

The years 1915 and 1925 included only six months.

Source: Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75.

**TABLE 5**  
**Infant Mortality Rates**  
**Quechan, Whites in the U.S., and Non-Whites in U.S.**

YEAR	QUECHAN	WHITES	NON-WHITES
1915	48	99	181
1916	158	99	185
1917	NA	91	151
1918	333	97	161
1919	357	83	131
1920	88	82	132
1921	353	73	109
1922	37	73	110
1923	539	74	117
1924	250	67	113
1925	NA	68	111

The population of the Fort Yuma Agency for 1910 was 834 and for 1929 it was 846. Infant mortality rates for the Quechan are based on an average of 840 based on these two population figures.

Sources: *Historical Statistics of the United States, Colonial Times to 1970*, p.57, and Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75.

**TABLE 6**  
**Moving Averages of Infant Mortality Rates**  
**Quechan, Whites in the U.S., and Non-Whites in U.S.**

YEARS	QUECHAN	WHITES	NON-WHITES
1915-16	103	99	183
1917-18	167	94	156
1919-20	223	83	132
1921-22	195	73	110
1923-25	260	70	114

Sources: *Historical Statistics of the United States, Colonial Times to 1970*, p.57, and Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75.

**TABLE 7**  
**Sex and Major Causes of Death**  
**Fort Yuma Indian Agency, 1915-1925**

CAUSE	MALE	FEMALE	TOTAL	PERCENT
Tuberculosis	32	29	61	32
Pneumonia	15	5	20	11
Gastrointestinal	8	10	18	10
Malnutrition	5	8	13	7
Syphilis	1	9	10	5
Senility	5	5	10	5
Total	66	66	132	70

Percents are based on 189 known causes of death found within the Registers of Vital Statistics.

Source: Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75.

**TABLE 8**  
**Tuberculosis Averages, 1915-1925**  
**Among Quechan and United States Population**

YEARS	QUECHAN	UNITED STATES
1915-16	119	139
1917-18	417	147
1919-20	1072	120
1921-22	714	97
1923-25	873	88

Sources: *Historical Statistics of the United States, Colonial Times to 1970*, p.58, and Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75.

**TABLE 9**  
**Pneumonia Averages, 1915-1925**  
**Among Quechan and United States Population**

YEARS	QUECHAN	UNITED STATES
1915-16	60	146
1917-18	357	147
1919-20	536	215
1921-22	179	116
1923-25	79	130

Sources: *Historical Statistics of the United States, Colonial Times to 1970*, p.58, and Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75.

**TABLE 10**  
**Gastrointestinal Disorder Averages, 1915-1925**  
**Among Quechan and United States Population**

YEARS	QUECHAN	UNITED STATES
1915-16	60	72
1917-18	417	74
1919-20	238	55
1921-22	179	116
1923-25	238	37

Sources: *Historical Statistics of the United States, Colonial Times to 1970*, p.58, and Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region.

**TABLE 11**  
**Syphilis Averages, 1915-1925**  
**Among Quechan and United States Population**

YEARS	QUECHAN	UNITED STATES
1915-16	NA	19
1917-18	NA	19
1919-20	298	17
1921-22	60	18
1923-25	159	18

Sources: *Historical Statistics of the United States, Colonial Times to 1970*, p.58, and Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region.

**TABLE 12**  
**Comparison of Quechan and U.S. Population**  
**Crude Death Rates per 100,000 Population**

	CAUSE	QUECHAN	UNITED STATES
<b>1915</b>	Tuberculosis	119 (1 death)	140
	Pneumonia	NA	144 (includes flu)
	Gastrointestinal	NA	68
	Syphilis	NA	18
<b>1916</b>	Tuberculosis	119 (1)	138
	Pneumonia	NA	163
	Gastrointestinal	119 (1)	76
	Syphilis	NA	19
<b>1917</b>	Tuberculosis	595 (5)	144
	Pneumonia	NA	165
	Gastrointestinal	238 (2)	75
	Syphilis	NA	19
<b>1918</b>	Tuberculosis	238 (2)	150
	Pneumonia	714 (6)	589
	Gastrointestinal	595 (5)	72
	Syphilis	NA	19
<b>1919</b>	Tuberculosis	1310 (11)	126
	Pneumonia	714 (6)	223
	Gastrointestinal	119 (1)	55
	Syphilis	595 (5)	16
<b>1920</b>	Tuberculosis	833 (7)	113
	Pneumonia	357 (3)	207
	Gastrointestinal	357 (3)	54
	Syphilis	NA	17

**TABLE 12  
(Continued)**

	CAUSE	QUECHAN	UNITED STATES
<b>1921</b>	Tuberculosis	476 (4)	98
	Pneumonia	119 (1)	99
	Gastrointestinal	NA	51
	Syphilis	NA	18
<b>1922</b>	Tuberculosis	952 (8)	95
	Pneumonia	238 (2)	132
	Gastrointestinal	NA	39
	Syphilis	119 (1)	18
<b>1923</b>	Tuberculosis	1071 (9)	92
	Pneumonia	238 (2)	152
	Gastrointestinal	119 (1)	39
	Syphilis	238 (2)	18
<b>1924</b>	Tuberculosis	714 (6)	88
	Pneumonia	NA	115
	Gastrointestinal	595 (5)	34
	Syphilis	119 (1)	18
<b>1925</b>	Tuberculosis	833 (7)	85
	Pneumonia	NA	122
	Gastrointestinal	NA	39
	Syphilis	119 (1)	17

The years 1915 and 1925 included only six months.

Sources: *Historical Statistics of the United States, Colonial Times to 1970*, p.58, and Registers of Vital Statistics for Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75. Statistics presented for pneumonia in the United States also include influenza.

**TABLE 13**  
**Quechan Indian Population**

<b>YEAR</b>	<b>POPULATION</b>
1872	2000
1882	930
1884	1200
1885	800
1886	1137
1888	1126
1905	900
1910	834
1929	846
1937	800
1940	913
1941	928
1950	2125 (979 on Reservation)
1994	2446

Source: Fort Yuma Agency Consensus, National Archives, Pacific Southwest Region, Record Group 75 and Quechan Tribal Census, 1994.

dreamer," Kumastamxo told the man. "When anybody has consumption lay your hands on him and suck the pain out continually, and in four months he will be well."<sup>45</sup> Between 1915 and 1925, tuberculosis took the lives of 61 (32 percent) people, including 32 males and 29 females (Table 7). Tuberculosis was a leading killer of the Quechan, and the rate of death due to this cause per 100,000 in the population in comparison to other populations in the United States is erratic due to the small Quechan population (Table 12).<sup>46</sup> Still, for some years, Quechan death rates resulting from tuberculosis are many times that of the general population of the United States. This was true for most years between 1915 and 1925, but the highest death rate caused by tuberculosis was 1,310 per 100,000 in the population which occurred in 1919 (Table 12). An average of tuberculosis deaths among the Quechan and the general population of the United States indicates that except for the two-year period of 1915 and 1916, the Quechan had a death rate per 100,000 higher than that suffered by the general population of the United States. For example, between 1919 and 1920, the Quechan had a death rate of 1,072 while the rate was 120 among all populations of the United States (Table 8).

Like other Native American populations, the Quechan suffered severely from tuberculosis, particularly in comparison to non-Indians in the United States. Indeed, among American Indians in general, tuberculosis raged in epidemic proportions in the early twentieth century, as tubercle bacillus moved rapidly through air, dust, and material items to infect thousands of Native Americans. Tubercle bacillus usually entered a person's body through the lungs, although it could be transferred from cups, bowls, plates, pipes, clothing, bedding, or soiled bandages. There are many forms of tuberculosis, as the disease can readily spread from the lungs to the brain, spine, lymph nodes, or any other part of the body. Although tuberculosis existed in the Americas prior to 1492, the disease did not ravage Indian populations in the American West until the late nineteenth and early twentieth centuries. Significantly, as Dr. Kirk Aleck of Phoenix pointed out, the rise of deaths among Native Americans in the West corresponded to the movement of large numbers of consumptives to California, Arizona, and other regions of the West in the early twentieth century—people who brought high concentrations of tubercle bacillus to the West. It also corresponds to the development of sanitariums throughout the region.<sup>47</sup> Quechans and other Native Americans

had little knowledge of tuberculosis until the early twentieth century, and medical officials employed by the Army and Office of Indian Affairs usually could not detect the disease in its early stages. They were not specialists in the disease and had few laboratories at which to identify the bacillus, provided they even believed in the germ theory discovered by Robert Koch in 1882.<sup>48</sup>

In 1904 Commissioner of Indian Affairs W.A. Jones reluctantly acknowledged that a tuberculosis epidemic was already underway among many Indian tribes and that it was caused by the failure of Indians to disinfect tubercular sputum. He also cited poor sanitation, intermarriage of Indians of the same tribe or with whites, lack of medical care, and the use of alcohol as causes for the infection and spread of the disease.<sup>49</sup> In addition, Jones targeted food as a predisposing condition that encouraged the invasion of tubercle bacillus. "The poor quality of food, its improper preparation, and the lack of sufficient quantity also exercise a predisposing influence," he wrote in his *Annual Report of Indian Affairs, 1904*.<sup>50</sup> "There is no question," Commissioner Jones asserted, "but that an ill-fed man is many times more liable to infection than one who receives a proper diet."<sup>51</sup> For the Quechan and most Indian tribes, Jones was exactly correct, for they lacked foods, particularly their traditional foods. The lack of food within Native American populations had made the people ripe for the bacterial attack, and tubercle bacillus spread with a vengeance within the weakened bodies of Indian men, women, and children.

Pneumonia was the second leading cause of death among the Quechan with a total of 20 (11 percent), including 15 males and 5 females, dying of the disease (Table 7). The Registers of Vital Statistics are not specific regarding the bacterial or viral nature of the disease, but most cases of pneumonia are bacterial. However, the Registers indicate that pneumonia attacked the young and old alike. Of the 20 people who died of pneumonia, 6 (30 percent) individuals were under the age of 2, while 9 (45 percent) were over 50 years of age.<sup>52</sup> Like tuberculosis, pneumonia attacks the lungs and is a respiratory disease usually caused by bacteria, and it is influenced by poor diet and inadequate housing, sanitation, public health, and preventive programs.<sup>53</sup> Pneumonia was particularly virulent among the Quechan in 1918 and 1919 and coincided with the worldwide outbreak of Spanish influenza during those years. In 1918 and 1919 the Quechan had a death rate of 714 per 100,000 in the

population caused by pneumonia for each year, while the death rate in the United States was 589 in 1918 and 223 in 1919. In terms of moving averages of death rates resulting from pneumonia, the Quechans had the highest average rate of 536 in 1919 and 1920, compared to an average death rate in the United States for this period of 215. Indeed, except for the six months of 1915 and 1925, the Quechan had higher death rate averages due to pneumonia than did the population of the United States for all years under examination (Table 9).

Gastrointestinal disorders ranked as the third leading cause of death at the Fort Yuma Reservation, taking the lives of 18 (10 percent) Quechans, including 8 males and 10 females (Table 7). Children under the age of 2 primarily died of gastrointestinal disorders. A total of 11 (61 percent) children died of infections relating to stomach and intestines, a circumstance common among many populations of the world.<sup>54</sup> Infants and small children are weak, particularly when they are malnourished, and they are susceptible to deaths resulting from gastrointestinal disorders. Although the total number of deaths in any one year due to gastrointestinal disorders was not great, the modal years of death were 1918 and 1924, when 5 people per year died of this cause (Table 12). However, by averaging deaths caused by gastrointestinal disorders with the Quechan and general population of the United States, the Quechan had higher rates of death than others within the country except for the two-year average of 1915 (six months only) and 1916 (Table 10).

Malnutrition was not listed as a major cause of death within the *Historical Statistics of the United States* for the general population of the United States, and no comparisons can be made between the Quechan and the people of the United States. However, the mere fact that officials at the Fort Yuma Agency recorded that malnutrition was a major cause of death is telling. Malnutrition was the fourth leading cause of death among the Quechan, taking the lives of 13 (7 percent) young people, including 5 males and 8 females (Table 7). Significantly, all deaths caused by malnutrition were among children under 3 years of age, including 11 infants, a 1-year-old female, and a 3-year-old female.<sup>55</sup> Certainly there is a direct relationship here between these children and their mothers who were, most likely, also malnourished and unable to nurse their babies sufficiently to prevent their deaths. If mothers and babies were malnourished, it is reasonable to assume that others within the Quechan population—children and adults—were malnour-

ished, which in turn made them more susceptible to disease and death. In such a state as this, Quechan people had a difficult time fighting diseases, as their body's white blood cells were no match for bacterial infections. Simply put, the Quechan population was vulnerable to many diseases.

Syphilis and senility tied for the fifth leading cause of death among the Quechan between 1915 and 1925. Syphilis took the lives of 10 (5 percent) Quechans, including 9 females and 1 male (Table 7). Remarkably, 90 percent of all deaths caused by syphilis were those suffered by females. Only one of these females was an infant who had contracted the disease from her parents. All of the other deaths caused by syphilis were those of Quechans between the ages of 15 and 67 with the modal age of 30 with 3 deaths.<sup>56</sup> Because the Quechans suffered no deaths resulting from syphilis between 1915 and 1918, no averages of death rates could be calculated, but averages are offered for the years between 1919 and 1925. These averages demonstrate that Quechans had a higher death rate caused by syphilis than the general population of the United States (Table 11). Of course, syphilis is a sexually transmitted disease, but like other diseases, the progress of the infection is related to environmental factors, including the state of a person's physical and mental health.

Finally, senility was listed in the Register of Vital Statistics as a cause of death of 10 (5 percent) Quechans, including 5 females and 5 males (Table 7). In the late nineteenth and early twentieth century, senility was a common designation of death for elders, particularly because most causes of death were derived from clinical observations or descriptions given by informants, not medical descriptions. Most causes of death described in Registers of Vital Statistics on Indian reservations were clinical, not medical. That is, medical men and women working on reservations usually did not perform autopsies, and there is no indication in the papers of the Fort Yuma Agency that doctors performed any autopsies. Therefore, when a recording agent was not sure of the cause of death of elderly Indians, they designated senility as the cause of death (Table 7).<sup>57</sup> However, clinical causes of death are very important because they provide a practical description of deaths on reservations. Recording agents likely made their best judgment as to the cause of death, often depending on whether or not they knew something of the medical history of the patient. Clinical observation is probably the way in which non-Indians working

at the Fort Yuma Agency distinguished between tuberculosis and pneumonia, or tuberculosis and gastrointestinal disorders. Clinical descriptions in the Register of Vital Statistics, Fort Yuma Agency, 1915-1925 represent the most complete and accurate sources available to scholars, and they illuminate what we know of the Quechan people in the early twentieth century.

Without additional data, it is impossible to state whether or not life expectancy increased or declined among the Quechan as a result of contact with non-Indians and the reservation system. It is known that the Quechans suffered from smallpox and measles during the nineteenth century and that the population declined from approximately 2,000 people in 1872 to 834 in 1910. Between 1910 and 1929 (when the population was 846), the average population at the Fort Yuma Agency was 840. The population dipped to 800 in 1937 before recovering to 2,125 (with a reservation population of 979) in 1950. In 1994, the Quechan tribe recorded its tribal population—living on and off the reservation—as 2,446. During the years between 1915 and 1925, the Quechan population hovered around 840 people before declining in the 1930s and recording its nadir in 1937 (Table 13).<sup>58</sup>

Robert L. Bee has graphically shown many examples of frustration felt by Quechans in their dealings with the government. Depression among the people emerged over their interactions with white agents who used their power to end Quechan ceremonies, particularly the all-important cremation and Karook ceremonies that had been a part of the culture since the beginning of time. Agents forced Quechans to request permission to cremate their dead, burn the property of the deceased, and hold mourning ceremonies. Agents prevented the people from performing the last rites of the dead in traditional fashion because they were not Christians. This was at the very time when deaths increased due to food shortages. Agents also controlled Quechan marriages, punishing those not formally married and those that lived with others out of wedlock. Agents withheld food rations, farm loans, jobs, equipment, programs, and help to those Quechan that did not comply with agents' orders. Traditional leaders—political and religious—lost power and self-determination, which led to feelings of helplessness and anomie. This condition, coupled with increased bacteria and viruses as well as the lack of food, contributed to

conditions at the Fort Yuma Reservation that resulted in high morbidity and mortality.<sup>59</sup>

While other Native American populations recovered from invasion and conquest in the early twentieth century, the Quechan population continued to decline. The Quechan witnessed biological, environmental, psychological, and economic changes within their community which encouraged new and dangerous pathogens to prosper. Fort Yuma Reservation offered a new and vulnerable host for disease because people were suffering from malnutrition and tribal anomie. As a consequence, the Quechan suffered high infant mortality rates and high death rates resulting from tuberculosis, pneumonia, gastrointestinal disorders, malnutrition, and syphilis. The lack of food between 1915 and 1925 is but one of many factors that contributed to the mortality history of the Quechan, but it is a component easily documented. The major reclamation projects of the Lower Colorado River forever changed the flow of the Colorado River—Kumastamxo's blood—and the relationship of Quechan people with the rivers, plants, and animals. All of these changes, heralded in the past as part of the winning of the West, contributed to poverty, disease, and death on the Fort Yuma Reservation of California in the early twentieth century.

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### NOTES

1. John P. Harrington, "A Yuma Account of Origins," *Journal of American Folklore* 21 (1908): 4-15; Natalie Curtis, "Creation Myths of the Cochans (Yuma Indians)," *The Craftsman* 16 (1909): 559-567.
2. Hubert H. Bancroft, *History of California* 1 (San Francisco: The History Company, 1886), 357-364.
3. Jack D. Forbes, *Warriors of the Colorado: The Yumas of the Quechan Nation and Their Neighbors* (Norman: University of Oklahoma Press, 1965), 288-340; Clifford E. Trafzer, *Yuma: Frontier Crossing of the Far Southwest* (Wichita: Western Heritage Press, 1980), 136-147.

4. S. Ryan Johansson, "Food for Thought: Rhetoric and Reality in Modern Mortality History," *Historical Methods* 27 (1994): 118. Johansson provides a penetrating and provocative article that challenges the precepts of Thomas McKeown, *The Modern Rise of Population* (New York: Academic Press, 1976), which argues that nutrition is the foremost factor affecting disease. Johansson deconstructs many aspects of McKeown's work, using specific examples to argue that McKeown used "rhetoric" rather than scientific fact in presenting some of his work. However, also see Robert I. Rotberg, ed., "Hunger and History: The Impact of Changing Food Production and Consumption Patterns on Society," special issue of *The Journal of Interdisciplinary History* 15 (1983). Several excellent research articles are provided that link food with diseases, but see Thomas McKeown, "Food, Infection, and Population," 227-248.

5. *Ibid.*, 116.

6. *Ibid.* Johansson relies on Samuel Preston, *Mortality Patterns in National Populations* (New York: Academic Press, 1976). See also Samuel Preston and M.R. Haines, *Fatal Years: Child Mortality in Late Nineteenth-Century America* (Princeton: Princeton University Press, 1991). Preston and Haines stress the significance of public health as a major factor in the spread of infectious diseases.

7. Wesley W. Spink, *Infectious Diseases: Prevention and Treatment in the Nineteenth and Twentieth Centuries* (Minneapolis: University of Minnesota Press, 1978), 130.

8. F. B. Smith, *The Retreat of Tuberculosis, 1850-1950* (London: Croom Helm, 1988), 173.

9. Johansson, "Food for Thought," 118.

10. Trafzer, *Yuma*, 42-68.

11. *Ibid.*, 69-121. For the executive order creating the Fort Yuma Reservation on January 9, 1884, see Charles J. Kappler, *Indian Affairs, Laws and Treaties* (Washington, DC: Government Printing Office, 1904), 832.

12. C. Darryl Forde, *Ethnography of the Yuma Indians* (Berkeley: University of California Press, 1931), 186. Also see Edward F. Castetter and Willis H. Bell, *Yuman Indian Agriculture* (Albuquerque: University of New Mexico Press, 1951).

13. It is impossible to determine exact death rates, infant mortality rates, life expectancy, etc. of the Quechan prior to white contact or to argue that mortality became worse after contact. Mortality and birth records in the early twentieth century exist only for those years between 1915 and 1925, and this evidence suggests high infant mortality rates and mortality rates resulting from specific diseases and malnutrition in comparison to other American populations.

14. Bancroft, *History of California* 1, 361-365.

15. Forde, *Ethnography of the Yuma Indians*, 114-115.

16. Bancroft, *History of California* 1, 358-366.

17. Forde, *Ethnography of the Yuma Indians*, 109.

18. *Ibid.*, 108.

19. *Ibid.*, 110.

20. *Ibid.*, 107.

21. The *Arizona Sentinel*, a local Yuma weekly newspaper, contains several articles and tidbits of information regarding farming and irrigation in the Yuma Valley in the 1890s. See *Arizona Sentinel*, November 8, 1890; April 4, 1891; January 16, March 12, 19, April 2, 1892; March 4, November 4, 1893; March 24, August 3, 1894; October 12, 1895; May 9, 1896; August 3, October 22, 1897; August 5, 1899. While most of the present study deals with agricultural development of the Yuma Valley and the diversion of water from the Colorado River, non-Indian farmers diverted thousands of acre feet of water from the Gila River east of Quechan territory as early as the 1860s when José María and Jesus Redondo built a dam and diverted water into the fields of Rancho San Ysidro. This rancho, located about seven miles upstream from Yuma (Arizona City) in the Gila Valley, was one of several farms operating along the Gila River during the late nineteenth century. Other irrigation projects included Norton's Canal (1885), Mohawk Valley Canal Company (1885), Hackett's Canal (1887), Antelope Canal Company (1887), North and South Gila Canal Company (1887), Farmers Irrigation Canal Company (1888), etc. See *Arizona Sentinel* March 28, April 4, May 6, June 6, December 5, 1885; May 8, September 11, September 25, October 2, 23, November 12, 1886; January 29, April 16, 30, July 23, August 13, 20, October 8, 1887; November 3, 10, 1888; August 17, 1889.

22. The United States gave two private irrigation companies, the Yuma Pumping Irrigation Company and the Colorado River Irrigation Company, favored treatment with rights of way through the Fort Yuma Reservation. See Kappler, *Indian Affairs* 1, 460-461. The first contract to construct Laguna Dam was issued in May 1905 to J. G. White Company of New York for \$797,650, and work began on the project July 19, 1905. On January 16, 1907, the United States took over construction of the dam (see *Arizona Sentinel*, January 16, 1907) which was completed in March 1909. The government also built a canal to carry water from Laguna Dam south and west to a large siphon constructed under the Colorado River between the Fort Yuma Reservation and Yuma. The siphon carried its first irrigation water from the reservation into the Yuma Valley in July 1912. For details of the irrigation project, see "Yuma Valley," Notebooks of Harvey Johnson, Johnson Collection, Yuma County Historical Society, 240 Madison Avenue, Yuma, Arizona, (hereafter cited as "Yuma Valley," Johnson Collection, YCHS). The author also has copies of all of these notes courtesy of Ruth Johnson. Also, see *Arizona Sentinel* January 16, 1907; February 19, June 17, September 2, 1908; February 4, March 4, April 1, 29, 1909; January 27, 1910; April 13, 1911; July 4, 11, 1912. Also, see *Yuma Examiner* January 30, November 10, 1909; July 14, 1910.

23. *Arizona Sentinel*, April 1, 29, 1909. Also see descriptions and chronologies in "Yuma Valley," Johnson Collection, YCHS.

24. *Arizona Sentinel*, July 4, 1912.

25. "Yuma Valley," Johnson Collection, YCHS.

26. *Ibid.* Johnson provides the sequence of events leading to the break in the Colorado River into the Imperial Valley, including cuts into the river for the

Chaffey Gate, bypass in the United States, and bypass in Mexico. These three cuts so weakened the river bank that when the river flooded, it jumped its banks and flowed north along the Alamo drainage and New River into Imperial Valley. In 1896 the California Development Company looked to the Colorado River as the source of irrigation for the vast Imperial Valley of California. In 1900 the company hired George Chaffey who engineered the construction of the headgate and canal which ran below present-day Algodones, Baja California, to Mexicali, Calexico, and north into the valley. After the company made three cuts into the river and the great stream overflowed its banks filling up the Salton Sea, the Southern Pacific Railroad took control of the California Development Company and dumped thousands of railroad car-loads of rock into the river to close the gap and force it to flow south into the Gulf of Baja California. See Catherine M. Miller, "Riparian Rights and the Control of Water in California, 1878-1928," *Agricultural History* 59 (1985): 1-24; Frederick D. Kershner, "George Chaffey and the Irrigation Frontier," *Agricultural History* 27 (1953): 115-122; *Arizona Sentinel*, June 14, 1905; August 29, November 7, 1906. In the 1930s and early 1940s, the government of the United States built Imperial Dam above Laguna Dam, diverting water into the All American Canal which moves west across the Colorado Desert along the border of Mexico and the United States. The water taken away from the Colorado River by non-Indians from Imperial Dam was diverted after the years of the present study of 1915 to 1925, but it represents one of many reclamation projects of the government that removed water from Quechan people. See Walton Bean and James J. Rawls, *California: An Interpretive History* (New York: McGraw Hill, 1988), 195, 298-305.

27. "Yuma Valley," Johnson Collection, YCHS. In 1894 the town was primarily situated in a low area west of the Gila River and the Arizona Territorial Prison. Yuma was positioned south of the Fort Yuma Indian Reservation of California and the Colorado River. The area on the mesa first developed was referred to as Yuma Heights, but major agricultural development of the Yuma Mesa did not begin until after the 1920s.

28. *Ibid.* According to Harvey Johnson, the foremost scholar to research the history of the lower Colorado River, the Yuma Mesa Auxiliary Project began in 1919 but had no water with which to irrigate lands on the mesa until 1922.

29. In 1912 the government of the United States allotted the Fort Yuma Agency into ten-acre parcels, but by "the 1920s and 1930s, farming was no longer a lucrative vocation for most Quechans. They had by then become wage earners ... serving as laborers or domestic help." They also leased their allotments to non-Indian farmers. While the government recognized allotments among the Quechan of ten acres, generally each Indian on other reservations received 160 acres, 80 acres, or 40 acres, depending on the person's age, marital status, and gender.

30. *Arizona Sentinel*, April 1, 1909; "Yuma Valley," Johnson Collection, YCHS.

31. *Arizona Sentinel*, July 4, 1911.

32. *Yuma Morning Sun*, January 13, 1924.
33. Yuma County Supervisors Records, 1865-1911, Yuma County Board of Supervisors, Yuma, Arizona. The Johnson Collection, YCHS, contains a calendar of some documents included in this collection.
34. Rene and Jean Dubois, *The White Plague: Tuberculosis, Man, and Society* (Boston: Little, Brown, and Company, 1952), 127.
35. Ibid.
36. Michael E. Teller, *The Tuberculosis Movement: A Public Health Campaign in the Progressive Era* (New York: Greenwood Press, 1988), 102.
37. Dubois and Dubois, *The White Plague*, 127.
38. *Annual Report of the Commissioner of Indian Affairs, 1888*, xxxiii.
39. A search of the National Archives, Pacific Southwest Region reveal Registers of Vital Statistics for deaths and births among the Quechans only for the years between 1915 and 1925. The documents are fairly complete, although the years of 1915 and 1925 contain only six months of data during each year. The death registers provide information on the causes of death, sex of the deceased, and age of the person. Some of the *Annual Reports of the Commissioner of Indian Affairs* contain other data regarding deaths, but the present study is limited to those data taken from death registers. In addition, an article entitled "Save the Babies," *The Red Man* 8 (1916): 221-262 contains data on the total number of births and deaths (all ages) among the Quechan for the years 1911 to 1915. The journal articles in this issue of *The Red Man* condemned Indian medicine people who were portrayed in the journal as being filled with "heathenistic rites and customs" that threatened the health of Native people, 232.
40. Registers of Vital Statistics, Deaths and Births, Fort Yuma Agency, 1915-1925, National Archives, Pacific Southwest Region, Record Group 75.
41. The quotation of Commissioner of Indian Affairs Valentine is from the Proceedings of the Lake Mohonk Conference, 1909, 20-21, A. K. Smiley Library, Redlands, California.
42. Diane T. Putney, "Fighting the Scourge: American Indian Morbidity and Federal Policy, 1897-1928" (Milwaukee, WI: Marquette University, Ph.D. Dissertation, 1980): 115-117. Putney offers an indepth study of Indian deaths, and in this case uses the private correspondence of Newton to Valentine. Also see Todd Benson, "Race, Health, and Power: The Federal Government and American Indian Health, 1909-1955" (Stanford: Stanford University, Ph.D. Dissertation, 1993): 16-37. Anyone interested in American Indian health must consult Putney's and Benson's works.
43. Robert L. Bee, *Crossroads Along the Colorado: The Impact of Government Policy on the Quechan Indians* (Tucson: University of Arizona Press, 1981), 66, 74-76, 81. Also see Robert L. Bee, "Quechans," in Alfonso Ortiz, ed., *Handbook of North American Indians, Southwest* (Washington, DC: Smithsonian Institution Press, 1983), 94-95.
44. Ibid.
45. Malcolm Margolin, ed., *The Way We Lived: California Indian Stories, Songs & Reminiscences* (Berkeley: Heyday Books, 1981), 120-121.

46. Crude death rates are given per 100,000 in the population so that Quechan statistics can be compared with those for other populations of the United States provided per 100,000 population in the *Historical Statistics of the United States*.

47. Telephone interview with Kirk Aleck, October 12, 1995.

48. Dubois and Dubois, *The White Plague*, 100-101, 178-181.

49. *Annual Report of the Commissioner of Indian Affairs, 1904*, 34.

50. *Ibid.*, 35.

51. *Ibid.*

52. Registers of Vital Statistics, Fort Yuma Agency, NA, PSWR, RG 75.

53. Spink, *Infectious Diseases*, 209-213.

54. Registers of Vital Statistics, Fort Yuma Agency, NA, PSWR, RG 75.

55. *Ibid.*

56. *Ibid.*

57. *Ibid.*

58. Most of the population figures were provided by Paul Wormser, archivist, National Archives, Pacific Southwest Region, but the Quechan tribe provided other population figures, including that of 1994.

59. Bee, *Crossroads Along the Colorado*, 75-76, 78, 82.