

## Culture



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Ingeborg Marshall

Volume 1, Number 1, 1981

URI: <https://id.erudit.org/iderudit/1077276ar>

DOI: <https://doi.org/10.7202/1077276ar>

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### Publisher(s)

Canadian Anthropology Society / Société Canadienne d'Anthropologie (CASCA), formerly/anciennement Canadian Ethnology Society / Société Canadienne d'Ethnologie

### ISSN

0229-009X (print)

2563-710X (digital)

[Explore this journal](#)

### Cite this article

Marshall, I. (1981). Disease as a Factor in the Demise of the Beothuck Indians. *Culture*, 1(1), 71–77. <https://doi.org/10.7202/1077276ar>

### Article abstract

After 330 years of European exploration and settlement on the island of Newfoundland, the Beothuck Indian population became extinct. In order to establish how far the demise of these Indians was due to diseases introduced by the Europeans, bubonic plague, smallpox, measles and tuberculosis, these are considered in relation to the changing circumstances of the Beothucks and their patterns of contact with each other and with the European settlers. The effect of these diseases on Beothuck demography is discussed using documentary evidence of disease incidence in the Newfoundland population as well as comparative data from other North American Indian groups.

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# Disease as a Factor in the Demise of the Beothuck Indians

Ingeborg Marshall

Memorial University of Newfoundland

## *Introduction*

At the end of the 15th century, when explorers and fishermen came to Newfoundland's shores, the island was inhabited by the Beothuck Indians. If their population density was similar to that of other subarctic hunters with a comparable subsistence pattern, then the Beothucks may have amounted to about 1 100 people at contact (Kroeber, 1965: 142; Eggan, 1968: 180)<sup>1</sup>. Archaeological evidence of Beothuck occupation is scarce and it may well be that the Beothuck group was substantially smaller. During the historic period the native population decreased and became extinct by 1829.

This fate has befallen a number of North American Indian groups and has often been attributed to disease introduced by Europeans. Sherbourne Cook (1973) has made a good case that smallpox and other epidemics reduced the New England native populations by as much as 75% and that tuberculosis, measles and other infections caused further attrition to the population at a rate of 1.5% per year which amounted to a reduction of 80% within 100 years.<sup>2</sup>

Cook's figures have been used to suggest a similar attrition to the Beothuck Indian population (Upton, 1977) but in the absence of documentation, the impact of disease on the Beothucks during the early contact period has been entirely assumed and there has not been a serious investigation of the relevant factors.

The purpose of this paper is to discuss the transmission of different diseases to the Beothucks and to

estimate their possible effects on Beothuck demography. Attention was given to bubonic plague and smallpox, two of the most devastating epidemic diseases in England; in addition measles and tuberculosis were considered, the latter having been recorded among the Beothucks in the early 19th century.

The method has been to assemble records of disease among the European Newfoundland population, the Beothucks and other native groups, to consider the aetiology and mode of transmission of the diseases in question and to apply the collected information to the situation of the Beothuck Indians.

## *Beothuck Ecology and Contacts*

The time span of Beothuck/European co-existence on the island of Newfoundland can be divided into two periods: the first 230 years from ca. 1500 to 1730, marked by avoidance of contacts with Europeans and by a drastic reduction of the Indian territory; the second 100 years from ca. 1730 to 1830 characterized as a period of further territorial confinement, increasing persecution and involuntary contacts.

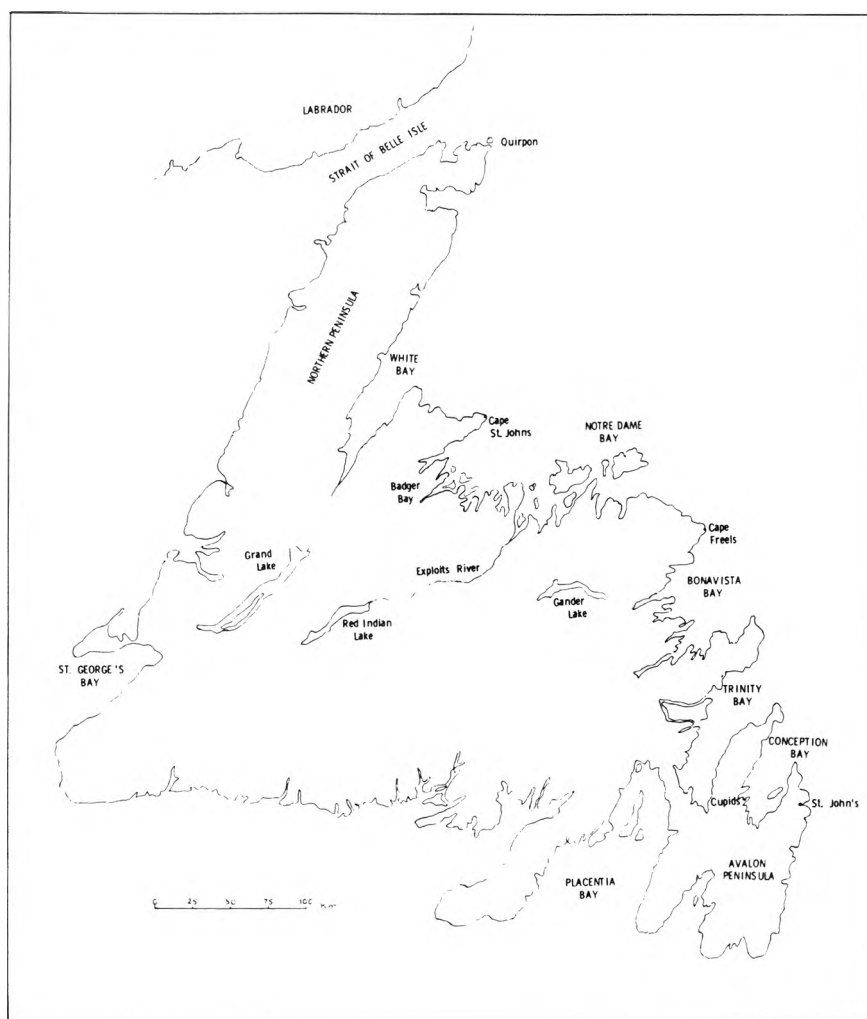
The Beothuck Indians were subarctic hunters and gatherers who alternated between the coast and interior regions. In the fall they congregated at lake and river crossings of caribou to intercept the herds on their migration routes. Their winter *mamateeks* (wigwams), which could accommodate from 10 to 20

people each, were erected close by. In spring these bands of co-operating hunters dispersed into smaller groups to the coast. Here their major foods were seal and Atlantic salmon, supplemented with porpoise, whale, seabirds, eggs, fish and other seafoods. Summer *mamateeks* were cone-shaped structures, often only large enough to house 4 to 5 people (Howley, 1915; Reynolds, 1978).

The Beothucks had probably been in possession of most of the island at the time of discovery. During

Beothucks were in possession of metal goods. But they neither acquired firearms nor engaged in a regular exchange of goods and therefore remained independent of the intrusive white population, avoiding contact.

Archaeological records (Tuck, 1976: 63) indicate that prehistoric Beothuck groups had been dispersed over much of the island; consequently contacts between the different bands or groups were probably infrequent. By 1730 this had changed. Fishing settle-



the 16th century when vessels from Europe came to fish in Newfoundland waters, the crews rarely went ashore other than to refurbish water and firewood, because most of the cod was processed and salted aboard ship. Few reports of encounters with the native population exist and they are seldom specific about the identity of the Indians (Howley, 1915: 3,4; Hoffman, 1963: 44). It appears that the native people were initially friendly but already 30 years after first contacts acted in a hostile manner of fled at the sight of a sailing ship (Howley, 1915: 10; Hoffman, 1961: 168, 177). No records of trade have been found, nevertheless by the beginning of the 17th century some

ments had been established along the eastern coast as far as Notre Dame Bay and were present on the western and southern shores. The Micmacs from Nova Scotia came regularly to St. Georges Bay to hunt for fur (Mathew, 1662; Thomson, 1732), dominated the south and west coast and claimed the region of Grand Lake and White Bay (Campbell, 1704; Taverner, 1713; Thompson, 1763; Parker, 1770). The Micmacs were not on friendly terms with the Beothucks and had firearms, which gave them superiority. The Northern Peninsula had become the hunting ground of the Montagnais from Labrador (Taverner, 1733) and the area of Quirpon Island off

the Northern Peninsula was visited by Eskimos during the summer season (Thwaites, 1970: 334; Morandière, 1962: 18).

There is no evidence that during the early period the Beothuck groups had united in an effort to resist the different intruders. Instead they gradually retreated into the area of Red Indian Lake and Gander Lake in the interior, travelling to the coast between Cape Freels and Cape St. Johns for food collection (Howley, 1915: 33). Shortly after 1700 the Beothucks lost most of their salmon rivers in Notre Dame Bay to newly established salmon posts which led to harassments and killings (Skeffington, 1720). Yet, during the first 230 years of co-existence white settlers or explorers did not penetrate into the inland habitat of the Beothucks and therefore during the winter no contact occurred. Encounters with Europeans took place on the coast in the summer and therefore with smaller groups. The dispersal, migration pattern and infrequent contact with others was not favourable to the spread amongst the Beothucks of those diseases which have a short duration of infectivity. The situation was probably similar to that in New England as described by Cook (1973) where contacts during the first 100 years were rare and sporadic and where "there is no evidence from written records or oral tradition that serious harm to the natives resulted".

The major cause of an assumed population decline during this early period was most likely the loss of territory, resulting in diminished food resources and extensive population movements. Adjustments of this nature and extent were bound to disrupt group compositions and possibly led to intergroup friction and changes in social structure and leadership all of which would have had a negative effect on the Beothuck demography.

The second period of Beothuck history, which covers the last 100 years of their existence—from ca. 1730 to 1830—was one of territorial confinement and more frequent contacts. The hostile attitude of the expanding settler population made it increasingly difficult for the Indians to collect marine foods on the coast and eventually they were forced to remain in the interior for most of the year. This deprived the Beothucks of their traditional subsistence during spring and summer and caused food shortages and starvation (Howley, 1915: 174). The Indians were also more actively harassed—in summer they were chased in their canoes or taken by surprise in their *mamateeks*; during the winter season parties of settlers and later of government agents ventured into the interior to seek out their camps, and this resulted in encounters and the capture of several natives.

Estimates and reports of the Beothuck population size at various intervals during these last 100 years (Marshall, 1978) indicate that a drastic population decline occurred in the second half of the 18th

century and the rate of decline accelerated after 1811. During these last 100 years of territorial confinement, diminishing food resources, close contact between bands and more frequent and extensive contacts with the white population, contagions could have been transmitted more easily. It is therefore suggested that disease had its greatest impact on the Beothuck population after 1730.

#### *Diseases: Bubonic Plague*

The bubonic plague caused major epidemics in western Europe until well into the 18th century after which time it generally disappeared though minor outbreaks have occurred after this date. Cook (1973) estimated that the average death rate among the central New England Indians in the epidemic of 1617/19 was 75%, which represents the highest average from any one disease in this region; but although these figures are documented, the presented evidence leaves considerable doubt as to whether this epidemic could have been the bubonic plague.

The bubonic plague is a rodent disease which is transmitted by a vector flea to man, after the rodent host has died. It is important that epidemics of plague can only be sustained through the presence of an infected rodent population, a rat flea and close proximity of both to humans (Shrewsbury, 1970: 5).

There is no evidence of plague among the Newfoundland population at any time<sup>3</sup> and the Indian habitations were too remote to be invaded by rats from settlements<sup>4</sup>. The rodent implicated in the European plague epidemics was *Rattus rattus*, a house and ship's rat that would not swim and could not leave a vessel that was anchored off the coast. In addition Newfoundland climatic conditions were not suitable for the survival of the vector flea (Pollitzer, 1954). Bubonic plague can therefore be discounted as an influence on Beothuck demography.

#### *Smallpox*

The situation concerning smallpox among the Beothucks is difficult to assess because there are many unknown factors. The disease is caused by the *variola virus* and is highly contagious. The infective agent is usually transmitted from an active case of smallpox by droplets in the air to the respiratory passages of another person. It is also possible to transmit smallpox in clothing that contains scabs from the smallpox sores and, below 25°C, these scabs can stay virulent for several weeks.

Smallpox has been documented in the Newfoundland population from 1610 onwards,<sup>5</sup> but no sizable epidemic has been recorded and the likelihood of transmission to the Indians is small during the early period. Occasional exchange of goods appears to have taken place at a distance and items received by the

natives were tools rather than clothing or blankets which would have been the most likely articles to hold the contagion<sup>6</sup>.

In Labrador a presumed smallpox epidemic among a group of Eskimos, which is reported to have occurred in 1772 on the island of Ivuktoke appears not to have spread beyond this island area (Cartwright, 1792: 1: 424; Taylor, 1974: 9). But another route of transmission, namely via the Montagnais of Southern Labrador is possible. These Indians were infected with smallpox after it was brought to New France by the Jesuits in the 17th century (Thwaites, 1959: 24: 271; 29: 123). It has been noted that the Indians most closely associated with the missions suffered the most severe losses, implying that the effect of smallpox diminished in relation to the distance from the centres of the disease, that is the mission stations (Thwaites, 1959: 19: 91); people in isolated areas were less exposed to the virus and some camps escaped the disease altogether. Whether the Montagnais had a visiting relationship with the Beothucks of Newfoundland at the time when smallpox was prevalent among them cannot be ascertained. Traditionally these two groups were on friendly terms (Howley, 1915: 26) and in 1719 the Montagnais endeavoured to meet with the Beothucks (Morandière, 1962: 22)<sup>7</sup>. The probability of a transmission of smallpox is substantial but it remains a matter of speculation whether it actually occurred.

Groups of Beothucks may well have been victim to smallpox but their geographic isolation, the infrequency of contact and the dispersal of these people over a large region—at least during the first 230 years when smallpox was most prevalent—would have prevented the large scale and repeated epidemics experienced elsewhere. Cook (1973) and Stearn and Stearn (1945) have given death rate figures due to smallpox among different North American Indian groups ranging from 17% to 100% with an average of 50-67%. This indicates a wide variety of responses to the disease.

It is speculated that though smallpox may have been transmitted from Labrador in the 16th or 17th century, this disease—for the reasons given above—would not have spread to every one of the widely dispersed Beothuck groups. The death rates would therefore have been at the lower end of the scale of the rates given for other groups.

### *Measles*

Measles, along with smallpox, is one of the most contagious of viral infections and it has caused a population decrease of up to 18% in other Indian groups<sup>8</sup>. Measles is transmitted in respiratory droplets from an active case through close physical proximity. Introduced to the Newfoundland population from new

arrivals it soon assumed a milder character and seldom existed for more than a season (Carson, 1830)<sup>9</sup>. Transmission to the Beothucks would have depended on encounters with an infected individual.

In this context information on epidemics from the three Moravian Mission stations in Labrador, which were founded in the 1770's and 80's should be considered. First mention of an unspecified epidemic was made in 1824 and the earliest measles epidemic was reported in two missions in 1827, that is within 50 years of regular contact. The population death rates were 5.7% and 9.5% (Kleivan, 1966: 146). This suggests that epidemics in Labrador did not occur as frequently as one might expect and were recorded at a time when extensive population movements and contact situations became more frequent.

I have concluded that among the Beothucks measles are not likely to have caused a major attrition to the population before 1730, but that it might well have had a more drastic effect on their demography during the last 100 years of their existence.

### *Tuberculosis*

Tuberculosis has been the major cause of death among the native American populations during the last century. Only after Indians moved into reservations and lived under closer medical observation was its impact noted. The largest percentage of tuberculosis infections in a population is found in the lungs but the disease may affect other sites, especially in childhood. Tuberculosis is caused through an invasion of the tubercle bacilli and a person may die within a few weeks or months of infection. More common is the development of chronic pulmonary tuberculosis, where the patient's condition may deteriorate only slowly. During this period there may be continual coughing up of tubercle bacilli. The dried sputum mingled with dust, can easily distribute the tubercle bacilli, which remain virulent for several weeks if not exposed to sunlight. Inhaling the bacilli alone does not necessarily result in clinical disease—the susceptibility of an individual and of a population are important factors and so are conditions of hygiene, overcrowding and starvation.

In Britain the incidence of pulmonary tuberculosis rose to a peak during the second half of the 18th century (Webb, 1936: 14) and it is assumed that it was similarly widespread in the European population of Newfoundland.<sup>10</sup> At about that time contacts between Beothucks and settlers became more frequent—Indians ventured into boats and sheds to steal sails and tools and settlers raided Indian camps in the interior. Two Indian boys were captured in the 1760's and both worked in fishing communities but were said to visit their Beothuck families for several weeks every year (Howley, 1915: 59, 288).

If tuberculosis had not been transmitted to the Beothucks previously, it most likely reached them in the second half of the 18th century. It only needed a single individual to become infected and the bacillus would have dispersed insidiously. The status of the Beothucks as a "virgin" population, that is previously unexposed, and their way of life, provided optimal conditions for the spread of this disease.

In addition the Beothucks were confined in a small territory, causing closer contacts between all groups, frequent reuse of old camps, and overpopulation of the area. To a degree this situation was comparable to reserves which were instituted at a much later date for other Indian groups and in which a dramatic increase of tuberculosis was experienced. Among Indians in Saskatchewan for instance the death rate abruptly changed from 1% to 9% per year after they were moved into reserves (Moore, 1961: 84)<sup>11</sup>.

Tuberculosis among the Beothucks is documented by the fact that three Beothuck females who fell into the hands of furriers in 1823 were said to be suffering from "pulmonary consumpoin" at the time of their capture and all three died of this disease. There is no other record of disease among the Beothucks and its presence at an earlier period can only be postulated. The Beothuck population has been estimated at *ca.* 350 people in 1768 (Marshall, 1978); it declined to 72 in 1811, to 27 in 1820, to 13 in 1823 and to 1 in 1829 (Howley, 1915: 224-229). These figures project a population reduction by 79% in 44 years at an average rate of 3.6% per year<sup>12</sup> between 1768 and 1811, a decline which was probably lower in the 1760's and accelerated at the turn of the century. By 1820 the population had been reduced by 92% and in 1823 by 96% (See Table I); the reduction rate between 1811 and 1820 was 10% per year, between 1820 and 1823 22% and between 1823 and 1829 35% per year.

These figures cannot be explained by the few reported killings alone, but rather suggest a lack of health among the Beothuck people. In combination with other infections, such as measles (Carey, 1965), tuberculosis could have already had a severe impact on the Beothuck population during the second half of

the 18th century. Based on comparisons with figures of tuberculosis mortality rates in other Indian groups<sup>13</sup> it is suggested that between 1768 and 1811 an average of 40% of all deaths among the Beothucks were due to tuberculosis and that this percentage rose up to 80% during the early 19th century. This would amount to a population death rate from tuberculosis of 2% in the earlier years and of 11% after 1811.<sup>14</sup>

Diminished numbers and the inability of those afflicted with disease to take part effectively in the food quest would have impaired the Indian's efficiency for making optimal use of their environment. Since malnutrition reduces resistance to infection and raises infant mortality the Beothucks would have entered a vicious cycle with sickness and starvation combining to ensure their extinction.

### Conclusion

The Beothucks take a special position among the North American Indian groups because they lived in an isolated island habitat and persisted in their avoidance of contact with the white population. It seems unlikely that during the first two centuries of the historic period (1500-1700) imported disease had a significant impact on their demography. This situation changed after *ca.* 1730 when they were confined into a small territory and were exposed to increased hostilities and more frequent contacts.

Of the diseases that have been considered bubonic plague has been rejected as a cause of death among the Beothucks.

It is likely that the Beothucks were exposed to smallpox, probably by the Montagnais from Southern Labrador, but their geographical isolation and distribution would have curbed a spread among these Indians, resulting in a lower than average population death rate. The impact of measles cannot be ascertained though it is more likely to have effected the Beothucks after 1730.

Tuberculosis documented in the Beothuck population by 1823 may already have been present in the 18th century. After 1768 an annual population decline was estimated at 3.6% accelerating to 10%, 22% and 35% between 1811 and 1829. It has been concluded

TABLE I  
Reduction of Beothuck Population

Years	Population Size	Reduction in % of 1768 Population	accumulative % of 1768 population	exponential rate of reduction
1768-1811	*350-72	79	79	3.6%
1811-1820	72-27	13	92	10.0%
1820-1823	27-13	4	96	22.0%
1823-1829	13- 1	3.4	99.4	35.0%

\* this figure is an estimate based on a 1768 map of Beothuck settlements.

that the decline was partly due to tuberculosis and that this disease has played a significant role in the eventual demise of the Beothuck group.

## NOTES

1. A.L. Kroeber (1965:142) has calculated an average population density of 1.11 per 100 km<sup>2</sup> for the eastern subarctic, including Montagnais/Naskapi/Tête de Boule/Beothuck/Cree. For the first 3 groups alone, who most closely resemble the Beothuck subsistence pattern and environment, the average was 0.44 per 100km<sup>2</sup>. An average of 1.11 would suggest a Beothuck population figure of 1378, an average of 0.44 would amount to 546 people. The average of these 2 estimates is 962. Kroeber's (1965: 169) calculation of population density in the northern Subarctic based on shoreline mileage is not applicable here.

F. Egan (1968: 180) has estimated a population density of one person per 100 km<sup>2</sup> in the north-eastern subarctic interior—this would allow for Newfoundland a capacity of 1 123 people.

2. Cook's calculation is based on census figures for the native population on two New England islands, Nantucket and Martha's Vineyard after 1642 and he has projected these findings to the native population of the whole of New England (1973).

3. Bubonic plague is now present in some rodent populations particularly in the south-western U.S. and is occasionally transmitted to a person (WHO, 1978) but no infected rodent population has ever been reported in Newfoundland (Marshall Laird, personal communication).

4. A letter from John Guy's colony to Willoughby in 1612 (Pearson) states that the "seeds the company sente over are spoiled with ratts in the shippe" yet there is no mention of disease in the settlement; indeed a note from July of that year reports that the health of the county surpasses that of England (Croute, 1612) and the only diagnosed sickness which initially presented a problem was that of scurvy (Croute, no date).

5. In October 1610 John Guy reported one case of smallpox on his way out to Newfoundland (ms. letter). James Yonge (Poynter, 1963: 133) in 1670 mentions smallpox on board that was brought to St. John's. In 1731 Rev. Fordyce recorded the death of two parishioners in St. John's due to smallpox (SPG. records). John Clinch wrote in 1789 that 3 ships with smallpox aboard had arrived in Trinity Harbour (SPG. records). In 1800 smallpox broke out in St. John's (Gov. Letter Books, 1800) and vaccination was administered.

6. John Guy records in his "Journal of our voiadge in the Indeavour begunne the 7 of October 1612" (manuscript) a meeting with Indians at which they shared food and exchanged presents. The Indians gave arrows without points, chains of shells, a feather from a headdress, and a splitting knife (?), and received knives, points, brass, as well as 2 handtowels, 2 table napkins, gloves, 1 shirt—items which could be spared and were given by Guy's party spontaneously. When the party later returned for barter, skins had been left by the natives on poles and "because we were not furnished with fit things for to trucke" (quoted from Howley 1915: 18) only a few skins were taken away and a hatchet, a knife, needles and scissors were left in exchange, as these items were apparently considered acceptable for barter. A list of provisions for the intended plantation in

Trinity (Middl. Papers, 1619) includes for truck with the savages "beads, hachets, looking glasses".

7. The Beothuck word for Labrador Indian is Shoadamunk and was reported to mean also "good Indians"—while Shannok stood for Micmac or "Bad Indians". (Gatchet quoted from Howley 1915: 422).

8. Measles: case mortality figures: 1846 Hudson Bay Indians 28% (Rolleston, 1937: 86); 1908 Indians at Oka/Quebec 55%, 1909 Indians at Caughnawaga 50% (Graham-Cumming, 1967); Population death rates: 1952 Ungava Bay Indians and Eskimos 6.9% (population 900) (Peart and Nagler, 1954); Alta California Mission Indians 1806: 18%; 1827/8: 12% (Keuper Valle and Valle, 1976).

9. Dr. W. Carson, general practitioner in St. John's reported in 1830 "Annually eight or ten passage vessels arrive from Ireland at the port of St. John's bringing from eleven to thirteen hundred passengers who generally carry with them the epidemic of those places from whence they embarked, few years therefore pass without an importation of typhus fever, smallpox, measles, hooping cough, or scarlet fever and annually an abundant supply of itch. But they all soon assume a milder character and seldom exist more than a season" (CO 194).

10. Dr. Carson affirmed in 1830 that "tubercular consumption is most prevalent although among the poor scrofulous affections are frequently to be met with" (CO 194). (Scrofula is tuberculosis of the lymphatic glands).

11. The Canadian Indian and Eskimo population experienced a population decline by ca. 3% between 1871 and 1899 on account of the high death rates due to tuberculosis (Wherrett, 1977: 99). In 1932 death from tuberculosis occurred 32 times more often in Manitoban Indians than among the white population of that province (Stewart 1934).

12. The exponential formula used was  $P_1 = P_0 (1-r/100)^t$  in which  $P_1$  is the resulting population,  $P_0$  the original population,  $r$  = percentage of reduction per year,  $t$  = number of years.

13. Proportional mortality rate from pulmonary tuberculosis: 1835-1846 Dakota Indians Lac qui Parle—50% of deaths among those aged 10 and over (Williamson, 1940). In 1876-1880 Dakota Indians Fort Bertold 32%, 1878-1885 Dakota Indians Cheyenne River 52%; Reservation Indians in 13 different States and Territories between 4.5% and 62.5%—from U.S. census figures (Matthews, 1886).

14. The net reduction rate from 1768 to 1811 was 3.6%, with a birthrate of ca. 1.5% added the death rate would have been 5.1%. If 40% of all deaths were due to tuberculosis then the population death rate due to tuberculosis would have been 2.0%. Between 1811 and 1823 the average net reduction rate was 13.3%, with a reduced birthrate of 0.5% added the population death rate is calculated at 13.8%. 80% of this percentage is 10.64% which represents the approximate population death rate due to tuberculosis after 1811.

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