

## Palisades and «Noxious Gases» among the South-American Indians.

By Erland Nordenskiöld.

At least three 16th century authors mention the use by the American Indians of «poisonous» gases, viz., Staden, Oviedo y Valdés, and Thevet.

Staden was a prisoner for a long time among the Tupinambá Indians. At the time of the discovery of America, the Tupinambá and other Guarani tribes inhabited the greater part of the Brazil littoral and large tracts on the Rio Parana.

Staden relates that when the Tupinambá tried to conquer a fortified village, they used «poisonous» gases. He says they made large fires, and when the wind blew they threw a quantity of red pepper into the fire. When the smoke entered the huts the inmates had to leave them.<sup>1</sup>

Evidently this does not point to ordinary «smoking out», but to the use of specially disagreeable fumes developed by the burning pepper.

It is probable that the use of poisonous gases was a stratagem of war specially employed for besieging fortified villages. With their

<sup>1</sup> *Staden, Hans.* Warhaftig Historia vnd beschreibung einer Landschafft der Wilden, Nacketen, Grimmigen Menschfresser Leuthen, in der Newen welt Amerika gelegen. Franckfurdt am Mayn [1556].

»Habe auch von jnen gehört/ aber nicht gesehen/ das/ weiß sie es thun wöllen/ sie ire feinde auss den festungē können vertreiben/ mit pfeffer/ welcher da wechst/ der gestalt. Sie wölten grosse feur machen/ wann der windt wehete/ vñ werffen dann des pfeffers einen hauffen darein/ wann der dampff zu jnen in die hütten schlüge/ müsten sie jnen entweichen/ vnd ich glaubs wol/ Dann ich war ein mal mit den Portugalesern/ in einer prouintz des landes Brannerbucke genät/ wie hie beuor gemelt. Da blieben wir mit einem schiffauff dem trucknen in einem reifer ligen/ dann die flut war vns entgangen/ vnd es kamen viel Wilder/ meinten vns zunemen/ aber kontens nicht. Da wurffen sie viel truckener streuch zwischē das schiff vnd das vfer/ vermeinten vns auch mit pfeffers dampffe zuerjæ/ Aber sie konten dz holz nicht anzünden.» T. II, Caput xxvij.

imperfect weapons, the Indians must have had great difficulty in storming a village that was well fortified. Nor was it in their line to do so. Their method of warfare was preeminently that of ambushade and the avoidance, as a rule, of exposing themselves to unnecessary danger.

They therefore tried to conquer such villages by means of all sorts of stratagems. Thus they made use of fire-arrows, with which they set fire to Buenos Ayres soon after the town had been founded.<sup>1</sup> Staden<sup>2</sup> also speaks of these arrows being used by the Tupinambá. Dobrizhoffer by the Abipones,<sup>3</sup> Martius<sup>4</sup> by the Chavantes, and *Du Tertre*<sup>5</sup> by the Caribs on the small Antilles. They are still used by the Mataco Indians in El Gran Chaco.<sup>6</sup> Another trick, as Staden relates, was the use of poisonous or disagreeable gases.

Oviedo y Valdés relates that in a fight between the Spaniards under Diego de Ordaz (1532) and Indians in the neighbourhood of Rio Orinoco, two young men went in front of the latter, each holding a pan with embers in one hand, and ground red pepper (*aji*) in the other. When the wind was against the Spaniards they sprinkled peppers on the embers. The smoke was not a little troublesome, for it soon disordered («desatinar») them, and caused repeated sternutation.<sup>7</sup> In short, the Indians quite simply made a gas attack, and Oviedo y Valdés was of opinion that they employed a cunning manner of warfare. In Venezuela, too, where the Indians had villages surrounded with palisades, noxious gases were probably

<sup>1</sup> *Schmidel, Ulrich*. *Viaje al Rio de La Plata (1534—1554)*. Notas bibliográficas y biográficas por Bartolomé Mitre. Prólogo, traducción y anotaciones por Samuel A. Lafone Quevedo. Biblioteca de la Junta de Historia y Numismática Americana. T. I. Buenos Aires 1903.

<sup>2</sup> *Staden*, l. c., T. II, Caput xxvij. «Auch nemen sie baumwoll/ vermengē sie mit wachs/ bindens obē an die pfeile/ stecken fewr darein/ das sein jre fewr pfeile.» Sie also, T. I, Caput iiii.

<sup>3</sup> *Dobrizhoffer, Martin*. An account of the Abipones. Vol. II, London 1822, s. 359.

<sup>4</sup> *Martius, Carl Friedrich Phil. v.* Beiträge zur Ethnographie und Sprachenkunde Amerikas zumal Brasiliens. I. Zur Ethnographie. Leipzig 1867, p. 270.

<sup>5</sup> *Du Tertre*. Histoire generale des Antilles. T. II, Paris M.DC.LXVII, p. 404.

<sup>6</sup> *Nordenskiöld, Erland*. Indianlif i El gran Chaco. Stockholm 1910, p. 123.

<sup>7</sup> «Delante de su escuadron traian dos mançebos con fuego en unos tiestos á ma nera de caçuelas en la una mano y en la otra; axí molido; y echábanlo en el fuego para que cómo estaban á sobreviento, diese el humo á los chriistianos en las narices, lo qual no les daba pequeño empacho, porque luego aquel sahumerio haçe desatinar é causa que se den muchos estornudos.» *Gonzalo Fernandez de Oviedo y Valdés*, Historia General y Natural de las indias, Libro XXIV, Cap. III, Madrid 1852 p. 219.

used in sieges, i. e. in fighting for position, though here they also employed them on their campaigns against the comparatively encumbered Spaniards. Thus, the palisade, is mentioned from there by Oviedo y Valdés, Castellanos, Simon, and others.

The only modern authors who, as far as I know, speak of the use of poisonous gases, are Crevaux<sup>1</sup> and Walter Roth. The former writes:

»Au dire du Capitaine Jean-Pierre, les vieux Oyampis voulant arrêter l'ennemi, entouraient leur village d'un cercle de feu<sup>2</sup> où ils jetaient des poignées de piment sec. Il est impossible de combattre quand on est pris d'un fol éternuement.»

The Oyampis live in French Guiana.

For his part, Roth<sup>3</sup> relates two stories from Guiana in which there are references to the use of smoke from burning pepper. In the first he mentions that one of two sisters had been killed by an evil spirit, which afterwards betook itself to its home in the silk-cotton tree. Then he goes on to speak of the parents.

«They then made a ring of fire right round the komaka tree, which the surviving daughter had no difficulty in pointing out to them, and as soon as the flames began to blaze, threw peppers into them. There must have been a big family of Yurokons in that silk-cotton tree, because as the irritating, pestiferous smoke arose, down came a lot of small baboons of which the fire made short shrift. They threw on more peppers and down fell a number of bigger baboons, and they soon shared the same fate. The parents now threw in the last of the peppers, and down scrambled the very Yurokon who had killed their elder daughter.»

Yurokon is a demon. This story is caribbean. Roth relates a similar one from Warrau.<sup>4</sup> In the latter the demons are also killed by the smoke of burning red pepper. It ends as follows: «The party made a large fire around the tree, and threw peppers into it; this smoked out and killed all the Hebu baboons, from the youngest to the oldest, the queer old grandfather Hebu<sup>5</sup> being killed last. Of course before giving up the ghost they did a lot of choking and

<sup>1</sup> *Crevaux, J.* Voyages dans l'Amérique du Sud. Paris 1883, p. 271.

<sup>2</sup> The text has *fer*, an obvious misprint for *feu*.

<sup>3</sup> *Roth, Walter, E.* An inquiry into the animism and folk-lore of the Guiana Indians. Thirtieth annual report of the Bureau of American Ethnology. Washington 1915, p. 231.

<sup>4</sup> *l. c.*, p. 293.

<sup>5</sup> Demon.

coughing and in his dying rage the old Hebu swore that this choking and coughing would remain with us forever. Indeed it is this pepper-sickness which is causing so much mischief now and killing so many of our children. We Warrau Indians have known the sickness for a long time as the «baboon cough», but you white people are ignorant of this, and persist in calling it whooping-cough.»

The stories in which the demons are brought under by the smoke of red pepper strike me as very interesting. That red pepper should play such a big part in Indian incantations is very natural, owing to its peculiar qualities.

It is quite a common belief among the Indians that evil spirits can be exorcized by the smoke of certain herbs. In my travels I came across instances of this among the Quichua, Aymara and Cavina Indians.

Instances could easily be adduced from published books, but this would take me too far from my subject.

The demons, too, can make use of pepper to harm people. Among the many demons mentioned by Koch-Grünberg<sup>1</sup> from The Indians in N. W. Brazil we may note the plant-louse demon *Budyaüöbo*, that lives in the lands under Indian cultivation. He pounds roasted pepper in a little mortar av Ambaúva wood and scatters the fine powder in the air so that it flies into people's eyes as they work on the fields. This makes them bleareyed.

I have not come across any other references to the use of poisonous gases by the South American Indians; that the North American Indians used them will be seen from Thevet's description, quoted at the end of the present paper.

I havn tried breathing the smoke of burning «aji»; even in small quantities it makes one cough.

«Aji», or the unpleasant qualities of red pepper when burning, would soon reveal themselves to the Indians, who cultivate the plant extensively. It was only necessary for someone to upset a basin of aji into the fire, and the hut would soon be cleared of its occupants. The unpleasant qualities of the smoke must have been pretty widely known.

Dv Tertre<sup>2</sup> even speaks of an antidote, or, to use a modern term, a «gas mask» against the dangerous smoke. Speaking of the red pepper, he says:

<sup>1</sup> Koch-Grünberg, *Theodor*. Zwei Jahre unter den Indianern. Zweiter Band. Berlin, 1910, p. 184.

<sup>2</sup> *Dv Tertre* l. c., T. II, p. 94.

»Sa graine sechee & mise sur les charbons ardens jette une fumée, qui ayant une fois gagné les narines, trouble tout le corps, blesse la poitrine, & excite une toux si fascheuse, que l'on perdrait la vie, si l'on ne sortoit promptement de la chambre, ou si l'on ne se servoit de ce remede, que j'ay appris d'un Portugais; car il n'y a qu'à mouïller son mouchoir dans de bon vinaigre, & l'appliquer aux narines pour empescher le mauvais effet de cette fumée.»

Professor C. G. Santesson of Stockholm has kindly sent me the following information about the irritating ingredient in red pepper. It is called *capsaicin* and is stated to be a common ingredient in the ordinary red pepper of *Capsicum annum* (and *C. longum*), but also in the much stronger Cayenne pepper of *Capsicum fastigiatum* Bl. (according to Kobert, of *Capsicum crassum* Wild). Some also call the red pepper of *Capsicum annum* Cayenne pepper or paprika. The substance is described sometimes as a camphoraceous volatile body, sometimes as a crystalline body; its composition is stated to be  $C_9 H_{14} O_2$ . All writers agree that capsaicin is extremely irritating, even to the extent of blistering the skin. According to one statement, the vapours have an excessively irritating effect on the mucous membrane. It is, however, uncertain if the last-named applies to the crystallised capsaicin or to some other ingredient in the drug, for it is also said to contain a bitter, skin-irritating, brownish red oil, *capsicole*.

A volatile, little known alkaloid is said to occur in small quantities. The volatility of the *Capsicum* ingredients cannot to any great extent be looked upon as volatility at an ordinary temperature, but only when heated, i. e. with the application of powder or fragments of the drug on burning coals.

Prof. Santesson also informs me that the irritating substance that occurs in red pepper, presumably does not pass into a form of vapour on being heated (as, e. g., evaporating alcohol, chloroform, or the like), but is given off in the form of a very fine powder which scatters in the air.

\* \* \*

I will now pass on to the use of palisades among the Indians.

The distribution of palisades in South-America is a point in their civilisation which has never been closely investigated.<sup>1</sup>

Palisades could not, of course, be used everywhere, since the

<sup>1</sup> Many references will be found in: *Waltz, Theodor. Anthropologie der Naturvölker. T. III, Leipzig 1862.*

proximity of a wood was necessary to the building of them. So we must not expect to find them in a great part of the poorly wooded tracts of western and southern S. America. Nor were palisades used wherever there was access to a wood. Moreover, the building of a palisade requires a fairly large number of men, it being an undertaking of considerable magnitude. Palisades existed at one time among the Araukaniens in Chile<sup>1,2</sup> (16th century), among the Guaranies on the Rio Paraguay (16th century),<sup>3</sup> along the coast of Brazil<sup>4,5,6</sup> (16th century), among the Juries in N. Argentina (16th century)<sup>7</sup> among the Baure in N. E. Bolivia<sup>8,9</sup> (17th century), among the Chiquitos in Bolivia (16th century)<sup>10</sup>, on the Amazon about where Manaos is now situated<sup>11</sup> (16th century), near the estuary of the Amazon<sup>12</sup> in the maritime districts and in the northern «llanos» of Venezuela (16th century)<sup>13,14,15,16</sup> on the Rio Apure (17th cen-

<sup>1</sup> *Rosales*. Historia general de el Reyno de Chile, Flandes Indiano. Edic. Vicuña Mackenna, 3 vols. Valparaiso 1877—78. (After *Medina, José Toribio*. Los Aborijenes de Chile. Santiago 1882, p. 127.)

<sup>2</sup> *Ercilla y Zúñiga, Alonso de*. Primera y segunda parte de la Aravcana. Anvers 1586 p. 9.

<sup>3</sup> *Schmidel*, l. c.

<sup>4</sup> *Staden*, l. c., T. II, Caput iiiij.

<sup>5</sup> *Lery, Jean de*. Histoire d'un voyage fait en la Terre du Bresil, dite Amerique. Quatrieme Edition. [Genève] 1600.

<sup>6</sup> *Soares de Sousa, Gabriel*. Noticia do Brazil. Noticias para a historia e geografia das nações ultramarinas. T. III, Lisboa, 1825 p. 277.

<sup>7</sup> Relacion en suma de la Tierra y poblaciones que don *Gerónimo Luis de Cabrera* gobernador de las provincias de los Juries ha descubierto . . . 1572—73. Relaciones geográficas de Indias. T. II, Madrid 1885, p. 141.

<sup>8</sup> Abregé d'une Relation Espagnole de la Vie & de la Mort du *Pere Cyprien Baraze*. Lettres edifiantes, X. Recueil, Paris M.DDC.XIII, p. 242.

<sup>9</sup> *Altamirano, Diego Francisco*, Historia de la misión de los Mojos. La Paz 1891, p. 107.

<sup>10</sup> *Guzman, Rui Diaz de*. Historia Argentina. Coleccion Angelis, T. I, Buenos Aires 1836, p. 103.

<sup>11</sup> Descubrimiento del rio de las Amazonas según la relación de *Fr. Gaspar de Carvajal* por José Toribio Medina. Sevilla MDCCCXCIV, p. 48.

<sup>12</sup> *Ortiguera, Toribio de*. Jornada del Rio Marañon. Nueva Biblioteca de Autores Españoles, T. 15, Madrid 1909, p. 372.

<sup>13</sup> *Oviedo y Valdés*, l. c., Libro XXIII, Cap. XII, S. 254.

<sup>14</sup> *Castellanos, Juan de*. Elegías de Varones ilustres de Indias. Segunda edicion. Biblioteca de Autores Españoles. Tomo Cuarto, Madrid 1850 (First edition 1589) p. 86, p. 131, p. 208.

<sup>15</sup> *Simon, Pedro*. Primera parte de las noticias historiales de las Conquistas de tierra firme en los indias occidentales. Parte I, Madrid 1627, p. 162, p. 243, p. 318, p. 322, p. 396.

<sup>16</sup> *Aguado, Pedro de*. Historia de Santa Marta y nuevo reino de Granada. Madrid, 1916—1917. T. II, p. 259, p. 264.

ture)<sup>1</sup> near the upper Rio Meta (16th century)<sup>2,3</sup> in the interior of Venezuela (18th century)<sup>4,5</sup>, in almost the whole of Columbia (16th century)<sup>6,7,8,9,10,11</sup>, and on the coast of Guiana (17th century)<sup>12</sup>.

The only modern traveller who, as far as I know, speaks of palisades is Appun,<sup>13</sup> who found an incomplete palisade among the Macusi Indians in the interior of Guiana.

The curious forts of the Jivaros are not palisades; they are of a different construction.<sup>14,15,16</sup>

Rivet describes them thus; «Quatre énormes et robustes poteaux de 25 mètres de haut, choisis parmi les arbres les plus résistants de la forêt, supportent une petite chambre carrée de 3 mètres de coté, á plancher de bois résistant, à toit analogue à celui des maisons, entourée d'une paroi de chonta et de caña sur une hauteur de 1 mètre; une grande échelle y donne accès.»

The statement that the Mundrucus Indians had some kind of

<sup>1</sup> *Carvajal, Jacinto de*. Relacion del descubrimiento del Rio Apure. Leon 1892. p. 203, p. 211.

<sup>2</sup> *Castellanos*, l. c., p. 217.

<sup>3</sup> *Simon*, l. c., p. 177, p. 193, p. 287. (The Operiguasindians near the upper Rio Meta.)

<sup>4</sup> *Relaciones geograficas de la Gobernacion de Venezuela (1767—68) con prólogo y notas de D. Angel de Altolaquirre y Duvalé*. Madrid 1909. Viage del Excmo. Señor D. Josef Solano, p. 278.

<sup>5</sup> *Gilij, Filippo Salvatore*. Saggio di Storia Americana. T. II, Roma MDCCLXXXI.

<sup>6</sup> *Oviedo y Valdés*, l. c., Lib. XXVI, Cap. XXIII, p. 389. Lib. XXVII, Cap. VII, p. 446.

<sup>7</sup> *Piedrahita, Lucas Fernández*. Historia general de las conquistas del Nuevo Reyno de Granada. Amberes 1688. Lib. III, Cap. III, p. 82. Lib. IV, Cap. V, p. 137.

<sup>8</sup> *Cieza de Leon, Pedro de*. The travels of . . . 1532—50. Hakluyt Society. Vol. 33, London MDCCCLXIV, p. 70, p. 76, p. 104.

<sup>9</sup> *Xeres, Francisco de*. Conquista del Peru (1534). Coleccion de libros que tratan de América raros ó curiosos. Tomo primero, Madrid 1891, p. 25. (First edition Sevilla 1534.)

<sup>10</sup> *Aguado Pedro de*. l. c., T. I. p. 445, p. 661. T. II p. 86.

<sup>11</sup> *Samanos, Juan de*. Relacion de los primeros descubrimientos de Francisco Pizarro y Diego de Almagro, sacada del Códice numero CXX de la Biblioteca Imperial de Viena. Coleccion de documentos inéditos para la historia de España. T. V, Madrid 1884, p. 194.

<sup>12</sup> *Biet, Antoine*. Voyage de la France equinoxiale en l'isle de Cayenne. Paris DC.MLXIV, p. 355.

<sup>13</sup> *Appun, Carl Ferdinand*. Unter den Tropen. T. II, Jena 1871. p. 368.

<sup>14</sup> *Vacas Galindo, Enrique*. Nankijukima. Ambato 1895, p. 68.

<sup>15</sup> Memoria de Viaje del señor Mesones Muro. *Larrabure i Correa*. Coleccion de documentos oficiales referentes á Loreto. T. II, Lima 1905, p. 203.

<sup>16</sup> *Rivet, P.* Les Indiens Jibaros. Extrait de l'Anthropologie. T. XVIII, T. XIX. Paris 1908, p. 72 (618).

forts<sup>1</sup> is erroneous. They have only a special building in which the men sleep and keep their arms,<sup>2</sup> i. e. a typical «men's house».

At the time of the discovery of America the Quichuas and Aymaras did not use palisades, but fortresses of stone and sun-dried bricks, so called adobes. Their country was in general unwooded, and in the wooded parts they inhabited the ground was certainly unsuitable for palisade constructions.

In the descriptions of palisades from different parts of S. America we can gather a number of details about them.

Ercilla<sup>3</sup> sings the praises of the palisades of the Araukans, which seem to have had the character of strongholds.<sup>4</sup> Latham, who is well versed in the old literature of Chile, writes about these palisades: «Later on they became expert in the construction of fortifications. These were generally built on a small hill, square in form, and constructed of trunks of trees, planted upright in the ground. Inside this enclosure was a smaller one which formed the real redoubt, arranged in the form of a palisade, with loopholes for archery. For a considerable space outside, the ground was honeycombed with pitfalls and ditches, lightly covered with branches of rushes and turf, at the bottom of which sharpened stakes were planted.»<sup>5</sup>

Staden<sup>6</sup> gives a very interesting description of the double palisades of the Tupinambá. The inner palisade was evidently compact and provided with loopholes; in the outer one the stakes were just close enough together to keep a man from creeping between them. The

<sup>1</sup> *Herdon, Wm. Lewis*. Exploration of the valley of the Amazon. Washington 1854. p. 314. *Waitz, Theodor*. Anthropologie der Naturvölker. T. III, S. 442.

<sup>2</sup> *Tocantins, Antonio Manoel Gonçalves*. Estudos sobre a tribu «Mundurucu». Revista Trimensal. T. XL, Rio de Janeiro, 1877. p. 73.

<sup>3</sup> »Señalado el lugar, hecha la traça,  
De poderosos arboles labrados  
Cercan vna quadrada i ancha plaça,  
En valientes estacas afirmados,  
Que a los defuera impide i embaraça  
La entrada y combatir, porque guardados  
Del muro, los de dentro facilmente  
De mucha se defiende poca gente.»

*Ercilla, l. c.*, p. 9.

<sup>4</sup> *Medina, José, Toribio*. Los Aborijenenes de Chile. Santiago 1882, p. 128 (quotes Rosales).

<sup>5</sup> *Latham, Ricardo*. Ethnology of the Araucanos. The Journal of the Royal Anthropological Institute of Great Britain and Ireland. Vol. XXXIX, London 1909. p. 363.

<sup>6</sup> *Staden, l. c.*, T. II, Caput iiii.

defenders would stand behind the inner palisade, where they were well protected and could with bow and arrow shoot down anyone who tried to break through the outer defence. The materials of the palisades, which were about ten feet high, were the stems of palms.

»Auch sein sie geneigt Festungen vmb jre hütten zumachen/ die ist so: Sie machen ein Stocket vmb jre hütten her auss Palmenbeumen/ die spalten sie von einander. Das Stocket ist wol anderthalb klaffer hoch/ machens dick dz kein pfeil hindurch mag kōmen/ habē kleine schiesslöchlin darinn/ da sie herauss flitschen/ Und v̄m das stocket her machen sie noch ein ander stocket/ von grossen hohen reideln/ Aber sie setzem die reydel nicht hart bey einander/ nur dz ein mensch nit kan hindurch kriechen.»

Lery<sup>1</sup> says explicitly that only a certain number of the border villages of the Tupinambá had palisades. These were 5 to 6 feet in height. He also says that the villages were surrounded with pointed pegs driven into the ground. Soares de Sousa,<sup>2</sup> who speaks at some length of the palisades of the Tupinambá, states that it was the border villages that were protected by palisades.

Schmidel<sup>3</sup> gives a full description of the palisades that surrounded the Guarani (Carios) village of Lambere (Lambaré). We are told that the villages were surrounded with double palisades. The stakes were as stout as a human being. They were driven six feet into the ground, and were so tall that a man could only reach the top with the tip of his sword. Beyond the outer palisades were moats and, fifteen feet from the wall, deep holes, well covered over, in which were hidden extremely sharp stakes.

Schmidel also describes in detail the threefold palisades round a Cario Village near Asuncion, called by him Froendiere.<sup>4</sup> To take

<sup>1</sup> Lery, l. c., p. 236.

<sup>2</sup> Soares de Sousa l. c. p. 277. »se estas aldeas estão em frontaria de seus contrarios, em lugares de guerra, faz este gentio de roda da aldeia huma cerca de páo a pique muito forte com suas portas, e seteiras, e afastado da cerca vinte, e trinta palmos, fazem de redor della huma rede de madeira com suas entradas de fóra para entre ella, e a cerca, para que se lhe os contrarios entrarem dentro, e lhe sahirem ao recolher, se embaraçarem de maneira, que os possam flexar, e desbaratar, como acontece muitas vezes. Sie also p. 296.

<sup>3</sup> Schmidel, l. c. p. 173. Schmidel's interesting book is plentifully illustrated. It seems to appear from the illustrations that other people beside the Guarani Indians had palisades on the La Plata, but Lafone-Quevedo rightly cautions us about the illustrations. Prologue to the Spanish edition of Schmidel, p. 69. The illustrations in Schmidel's book are from Hulsius' (Nuremberg 1599) editions of his travels.

<sup>4</sup> Schmidel, l. c. p. 236.

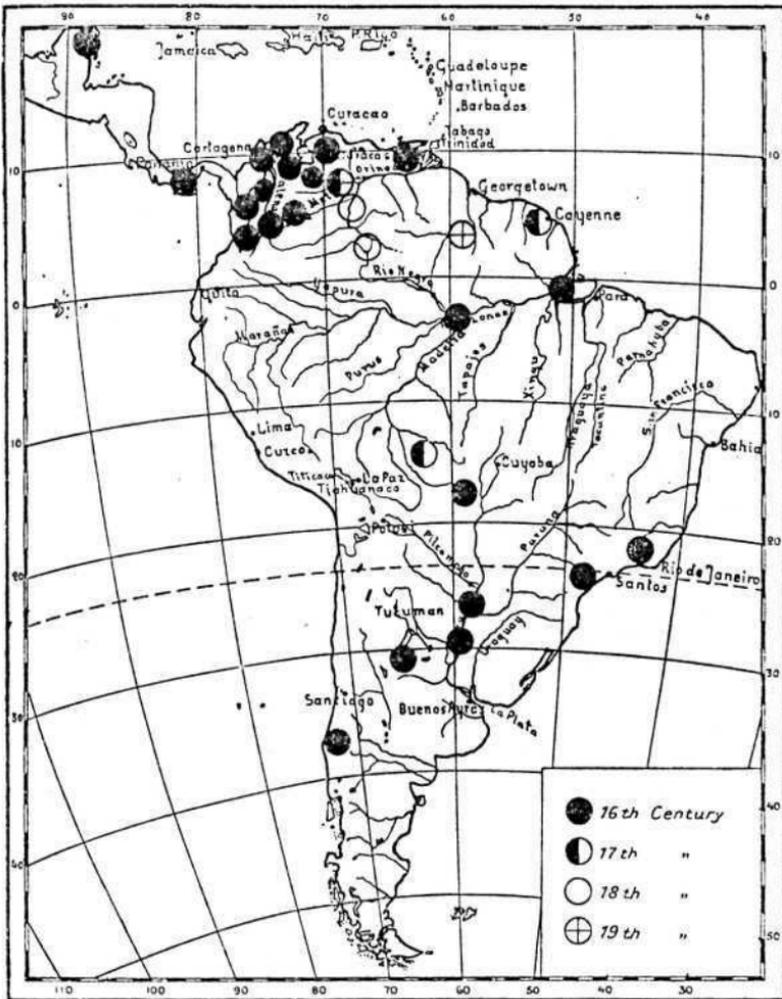


Fig. 1. The geographical distribution of palisades in South-America.

this villages, the spaniards made use of large shields of Tapir skin.

The palisades that Nuflo de Chaves found among the Travasicosis in Chiquitos, was evidently surrounded with a moat and with sharp stakes hidden in the ground.<sup>1</sup>

Of the palisades of the Baures we have no details.<sup>2, 3</sup> There are

<sup>1</sup> *Guzman*, l. c., p. 103.

<sup>2</sup> *Lettres edifiantes*, l. c.

<sup>3</sup> *Altamirano*, l. c.

no remains now of any palisades in Eastern Bolivia, but remains of the moats that surrounded the villages can still be seen in various places. One of some considerable size exists, for instance, at Matucare on the R. Guaporé. It must have skirted the settlement on the land side. The cultivated fields, too, were probably surrounded by forts.

We can gather very few details about the palisades mentioned by Gaspar de Carvajal<sup>1</sup> from the neighbourhood of Manaos. A village that Orellana and his comrades tried to conquer, was apparently surrounded by a palisade with only one entrance.

The fortifications the Spaniards found at the estuary of the Amazon during the expedition of Aguirre the Tyrant, were quite different from ordinary palisades.<sup>2</sup> They were fortified pile-buildings; the houses were built on piles, had thick walls of palm trunks and loopholes in the walls.

The palisades that Solano found as late as the middle of the 18th century among the distinguished Guypunavi Indians on the Upper Orinoco, are described in the *Relaciones geograficas de Venezuela*.<sup>3</sup> The posts were a foot thick, and were placed close together. Between every other one was a loophole three feet above the ground. About 5 yards (varas<sup>4</sup>) above the ground ran an inner terrace, from which one could shoot over the wall. Round the palisade ran a deep ditch in which had been placed poisoned stakes.

Gilij<sup>5</sup> also describes a palisade from the same Indians. He says it had only one entrance visible to strangers. The Guypunavi themselves, however, had other places through where they could get

<sup>1</sup> *Gaspar de Carvajal*, l. c., 48.

<sup>2</sup> *Ortiguera*, l. c., p. 372, »por este puerto y ensenada arriba dieran con unas casas fuertes armadas sobre gruesos y recios estantes que tenian hincados en el propio cabo desta eusenada de rio ó estero que alli se hacia, en tal manera que no se podia desembarcar por otra parte que por allí, por ser la ribera de mucha altura, llena de cieno, y en lo más alto grandes espesuras y malezas de cañas y arboledas; sobre estos estantes ó pilares estaban unas salas de tablas de palmas bravas, y cercadas á la redonda de la propia tablazon, con muchas troneras y ventanas.»

»Tablas de palmas» must mean here »slit palm trunks».

<sup>4</sup> l. c. p. 278. »Estos indios fortifican sus pueblos con un recinto de estacadas gruesa de un pie de diámetro y unida y abren entre cada dos estacas aspilleras á la altura de tres pies y á tres varas de alto, corren una banquetta interior, de donde por cima de la muralla tiran tambien al enemigo. Circunda á esta fortificacion para la cual aprovechan la del terreno un profundo foso de cuneta y en él ponen por abrojos unas puntas de madera durísima envenenadas, que como los indios van descalzos . . . »

<sup>5</sup> Vara = 0.8359 metres.

<sup>6</sup> *Gilij*, l. c., p. 219.

through the palisades. Gilij also speaks about the terrace mentioned in the foregoing description, on the inside of the palisade, on which sentries were placed at certain protected spots. Inside the palisade were a couple of huts with mudwalls, which seem to correspond to the inner palisade in the fortified constructions of the Tupinambá and other Indians. Gilij says that the whole construction was not more than 150 «palmi» in diameter.

The same author also describes in detail a fort from the Maipùri Indians on the Rio Tuàpu.<sup>1</sup> It was only protected on one side by a palisade, like the one from the Guypunavi Indians, though lower. The entrance, approached by a drawbridge which could be raised, seems, to judge from Gilij's description, to have consisted of two pairs of upright piles, between which heavy logs had been placed. Gilij says that it was like the entrance to one of «our sheep-pens»<sup>2</sup>. Inside the entrance was a little walled hut. On the remaining sides the place was protected by a prickly thicket of some bamboo-plant that Gilij calls «Guàdue». If the defenders thought the place was going to be taken, they had subterranean caves into which they could disappear.

The palisades mentioned by Jacinto de Carvajal<sup>3</sup> from the middle of the 17th century on the Rio Apure in Venezuela, were on heights overlooking the river.

A peculiarity of some of the palisades used near the coast of Columbia and Venezuela, was that they consisted of *rooted trees*, which were planted so close together that they formed a very strong palisade. This can be clearly seen from Oviedo y Valdés's description.<sup>4</sup> The trees were planted in such a manner that when they were grown they would be so close together that no one could creep between them.

These palisades in Columbia and Venezuela that Oviedo y Valdés

<sup>1</sup> *Gilij*, l. c., p. 220.

<sup>2</sup> »Mandrie.»

<sup>3</sup> *Jacinto de Carvajal*, l. c.

<sup>4</sup> *Oviedo y Valdés*, l. c., T. II, p. 254 (near Cumana) p. 446. Todas las mas de los pueblos que se han dicho, están cercados de muros de árboles muy gruesos é llenos de espinas las ramas é troncos dellos, é muy espessos é juntos, é son plantados é puestos á mano con tanto intervalo uno de otro, quando los plantan, quanto saben por experiència que creciendo pueden despues con el tiempo engrossar: é despues que han crecido todo lo que pueden, quedan tan apretados, que entre un árbol é otro no puede caber un hombre. Y en cada cerca hay dos órdenes de árboles ó rengles, como muro é contramuro, y entre la una cerca é la otra queda un vallejon ó barbacana de cinco o seys piés de ancho, todo á la redonda. É tienen sus puertas é contrapuestas donde les conviene, (District between Santa Marta y Cartagena).

describes were evidently nothing else than *hedges* of thick-stemmed trees. I think it very probable that the original palisades were simply hedges. Thus the Juries<sup>1</sup> in N. Argentina had villages surrounded with hedges of cactus and trees, which protected them against sudden attack.<sup>2</sup>

Herrera<sup>3</sup> says, too, that the Indians in N. Argentina had villages surrounded by enclosures of cactuses and spiny trees. These enclosures were protections against enemy attacks. The above mentioned fortification of the Maipuri Indians was only protected at certain places by thickets of spiny plants. Schmidel<sup>4</sup> also mentions a village from N. Chaco which was surrounded by a similar high hedge of spiny bushes.

In many places it was impossible to plant palisades, and there they built them up of piles stuck into the ground.

Oviedo y Valdés, in his description of the palisades from the district between Santa Marta and Cartagena, says that the branches and stems of the trees were full of spines. Of the palisades of the Indians near Cumana he says that spiny plants were interlaced with the stems.<sup>5</sup> In short, the Indians made use of natural barbed wire entanglements to prevent the enemy from breaking through the palisades and from climbing over them.

Temporary barricades of spiny plants were used by the Indians in many places. In my journeys I have heard of their being used by the Chiriguano and by the Indians in the woods on the upper Guaporé on the Brazilian side. When the Chiriguano made their last insurrection in the nineties of last century, they fortified themselves at Curuyuqui near Ivu with barricades of spiny bushes and the like.<sup>6</sup>

<sup>1</sup> A general name for several tribes. According to Boman, the Juries Cabrera speaks of were the same as the Comechingons in Sierra de Cordoba. *Boman, Eric*, Antiquités de la région andine de la République Argentine et du Desert d'Atacama. T. I. Paris. MDCCCXVIII.

<sup>2</sup> *Cabrera*. Relaciones geográficas de Indias, l. c., p. 141.

<sup>3</sup> *Herrera Antonio de* Descripción de las indias occidentales. Cap. XXI, Madrid 1730.

<sup>4</sup> *Schmidel*, l. c., p. 260.

<sup>5</sup> «Este pueblo llamado Anoantal es solamente los palacios é aposentamientos deste señor, y cercado de tres muros de unos árboles grosísimos puestos á mano y nascidos y en muy buena órden, y entre ellos entretexidos unos cordones de espinas é con tres puertas por donde entran é salen, y están muy fuertes aquellos adarves ó muros.» *Oviedo y Valdés*, l. c., T. II, S. 254. (The village of the indian chief Guaramental. Simon gives a description of the same village. p. 243.)

<sup>6</sup> See also *Martarelli, Angelico*. Adición a la historia del colegio de propaganda fide de Potosi y sus misiones. Potosi 1899.

Juan de Castellanos,<sup>1</sup> who also describes the palisades in Venezuela, makes a distinction between those that were of planted trees and those that were made of stakes driven into the ground.

It is of interest that Castellanos states that the palisades that were of planted trees were older than those of stakes, and here is he undoubtedly right.

Spira (von Speier) found an Indian village surrounded by a palisade at about the Rio Meta. The village was situated on a height. The palisade was made of logs and spiny palm stems placed very close together and provided here and there with loopholes. Outside the palisade was a deep ditch, full of very sharp stakes. Covering the ditch was a thin earth-covered roof, which was so well constructed that it was hard to discover that it was a trap.<sup>2</sup> The Spaniards

<sup>1</sup> *Castellanos Juan de*, l. c., p. 86.

»Aquestos dichos fuertes ó cercados  
Tienen señeros para su defensa  
De grosísimos árboles plantados.  
Donde la verde rama se condensa:  
Unos después de otros ordenados,  
Con mas vigor de lo que nadie piensa,  
Pues aquel gran grosor que lleva hecho  
Tiene de duracion prolijo trecho.»

Otros palenques hay mas estendidos  
En muchos destos campos y zavasas  
No de plantas de árboles nacidos,  
Como las otras cercas mas ancianas;  
Sino de palos muy fortalecidos,  
y cada cual con dos ó tres andanas,  
Con la cintas espesas de bejucos,  
O corréosas yedras de arcabucos.»

p. 131. »Amparados los indios belicosos  
Con cerca de tres cercos estendidos,  
Cada cual de maderos poderosos,  
Profundos y al cortar endurecidos  
Con yedras ó bejucos correosos,  
Unos con otros bien fortalecidos,  
Y en torno de las cercas de maderos  
Hoyos para meterse los flecheros.»

<sup>2</sup> Demas de la natural fortaleza q̄ tenía el pueblo en su asiento, estaua cercado de vna empalizada no muy alta, pero de maderos gruesos, troncos espinosos de palmas, tan juntos, y apretados vnos cō otros, que apenas se podian ver por entre medias los de dentro; estauan a trechos sus troneras por dōde disparar flechas. Rodeaua esta

did not succeed in taking this well fortified village. One of their men fell into the ditch, but was lucky enough to fall between two of the sharp stakes. The Spaniards called this fortification Salsillas after fort Salsas in Spain on the border of France.

In the 17th century some villages along the coast of Guiana<sup>1</sup> had double palisades. The following century these had already gone out of use.<sup>2</sup> The unfinished palisade that Appun<sup>3</sup> found among the Macusi consisted of stakes twenty feet in length, driven into the ground, with only a few inches between each. They were fastened together with cross-bars. The whole palisade leaned inwards, and was provided on the inside with props to keep it from falling. The fact that it leaned inwards enabled the defenders to shoot their arrows the more easily through the crevices, while at the same time the palisade served to protect them from the enemy arrows.

In the interior of Columbia, at the time of the conquest of the country by the Spaniards (beginning of the 16th century) palisades must have been quite common. The Chibchas in Bogotá had a fort<sup>4</sup> of interwoven reeds and stout posts in the heart of the village. The palisade was 15 ft. high and about 2,000 varas in circumference. As a protection against the sun and the rain the interior was covered over with a roofing of thick cotton cloth, which was 5 varas wide, and ran round the whole palisade.

Cieza de Leon mentions palisades from several places in Western Columbia.

Of those the Indians had in the Province of Arma, he says: »They have large fortresses built of stout canes pulled up by the roots, which are placed in rows by twenties, like a street, and in the centre the have, or had, when I saw the place, a high platform, well built of the same canes with steps up to it, where they offered

*cerca otra de vna honda caua, dentro de la qual estauan espessas varas hincadas en el suelo cō las puntas para arriba, tostadas, y agudas, cubierto todo el barranco por encima de vnas pequeñas varas que sustentauan vn delgado tez de tierra, sobre la qual estaua sembrada alguna yerua en partes, con que se disimulaua, de tal manera la trampa, que quien no la sabia, no diera en que estaua alli, sino es a su costa, despues de auer caydo. Que aunque estos naturales erū barbaros, en otras cosas, en su comodidad, y su defensa, no auia raposas mas arteras de ellas.* Simon, l. c., p. 177.

<sup>1</sup> *Biel*, l. c. p. 355.

<sup>2</sup> *Barrere, Pierre*. Nouvelle Relation de la France equinoxiale. Paris M. DCC. XLIII, p. 165.

<sup>3</sup> *Appun*, l. c. p. 368.

<sup>4</sup> *Piedrahita*, l. c. p. 137.

sacrifices.»<sup>1</sup> Of the palisades the Indians had in Pozo we read: — «At the doors of the houses there are great pallisades and other defences, made of stout canes, between which there are large boards covered with reeds, so that none of the mounted Spaniards could pass them.»<sup>2</sup>

As a rule, of course, the palisades were for protection against enemy attacks. But in a number of places they seem to have served as a fence against jaguars as well. Cieza de Leon says that this was the case at Cali in Columbia.<sup>3</sup> In the country of the chieftain Vrraca near Sierra Veragua in Central America, when Francisco Compañon pushed into their country in 1522, the Indian villages, according to Herrera, were surrounded by palisades. The Spaniard thought the Indians had built them as a protection against their Spanish foes, but in reality the Indians had had them for a long time to protect themselves against the jaguars.<sup>4,5</sup>

The question is, were the palisades a genuine Indian element in their culture? It may appear curious that I should raise the question at all, seeing that we have so many early proofs of the occurrence of palisades in large parts of S. America, not to mention Central and North America. However, we must remember that palisade fortifications were used by the first conquerors, and that the Indians, in a number of places at least, may not have learnt the use of them until post-Columbian times. The question therefore seems to me worth considering.

I also think that especially at this time, when the geographical distribution of cultural elements is used for all sorts of speculations thanks to the works of Græbner and Pater Schmidt, it is important to know their post-Columbian history — otherwise one could draw very erroneous conclusions. Thus, we know that we cannot yet with absolute certainty say whether the banana existed in America in pre-Columbian times. Again, I do not think it can be held proved that the «pellet-bow» was not introduced into South America in post-Columbian times by Portuguese from India. This very characteristic weapon is not mentioned by authors earlier than Dobrizhoffer, and yet we have detailed and much older works from

<sup>1</sup> *Cieza de Leon* l. c., p. 70.

<sup>2</sup> » l. c., p. 76.

<sup>3</sup> » l. c., p. 104.

<sup>4</sup> *Herrera, Antonio de. Historia General de los Hechos de los Castellanos en las Islas y Tierra Firme del Mar Oceano, Madrid 1726. Decada III, Libro III, Cap. IX.*

<sup>5</sup> We also find interesting details about the palisades in Columbia in *Aguado's* newly published manuscripts, l. c.

the places where it now occurs, and in which it is not mentioned. With what certainty can we assert that the Ona Indians did not learn from Europeans how to make fire with pyrites and flint? To what extent did Europeans spread the use of the tobacco-pipe in America, is another question of interest. It certainly existed in S. America in pre-Columbian times, but it is also probable that Europeans spread the use of it, after the discovery of America, among tribes to whom it was unknown up to then. The bow used by several tribes in cleaning cotton, was probably introduced into America in post-Columbian times; but this is not absolutely certain to have been the case. In what parts of America, for instance, is the leather drum an Indian cultural element, and in what parts is it one introduced by Europeans or negroes? Did the Omagua Indians learn from Europeans the use of the mosquito-net in the form in which it is used on the Amazon, or is it there an Indian invention? It was certainly not before the latter half of the 19th century that European explorers used them, and they are known from the Omaguas for a long while back. In what parts is the fishhook a genuine Indian cultural element? What form of paddle did the Indians take from the negroes? Many similar questions could be asked.

It is not until one has made historical investigations respecting the cultural elements that can derive from Europeans or negroes, that one can make use of these cultural elements for the solution of anthropo-geographical problems.<sup>1</sup> That is why I have here taken up for detailed examination the question whether palisades are a pre-Columbian cultural element or not, though to many it may seem self-evident that they are genuinely Indian. I will also point out how hazardous it may be to answer such a question though it applies to a cultural element such as palisades, statements about which are numerous and often plenteous in details in the literature of the 16th century. There is so much to be said on both sides.

It seems as if the occurrence of villages on the Amazon which were surrounded by palisades already in Orellana's time, ought to be a proof that such fortifications were really used by Indians there before they learnt about them from Europeans. This is not certain, however, for European influence had clearly made itself felt a good

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<sup>1</sup> The best historical investigations hitherto published about the cultural elements in South America, are Friederici's.

distance up the Amazon before his time. Thus Gaspar de Carvajal<sup>1</sup>, who, as we know, took part in and described Orellana's journey, relates that among the Indians of the lower part of the Amazon, but still far from the estuary, they found three-stringed rebecs («arrabeles»). The majority of the American authorities consider that the Indians did not know of stringed musical instruments in pre-Columbian times anywhere in America; not even among the highly civilized tribes of Mexico, Central and South America is there any mention of stringed instruments. They even assert that the musical bow<sup>2</sup> was unknown. It is therefore not possible for three-stringed rebecs to have been used by the Indians on the Amazon in Orellana's time, unless they took the idea from the Europeans. It is unthinkable that such a comparatively complicated stringed instrument should have occurred in such a restricted area of the American continent if it really was an Indian invention. And if, in this part of the Amazon the Indians had learnt from Europeans to use the rebec, it is not impossible that they also learnt from them how to build palisades. The Europeans who were presumably the cultural agents here, were the Portuguese.

Guevara<sup>3</sup> considers, and Latcham<sup>4</sup> also seems to consider, that the Araukans learnt the use of palisades from the Spaniards. The fact is that Valdivia already built palisades as a protection against the Araukans. In his letter of Oct. 15th, 1550, to Charles V. he tells how he built a palisade fort on the lower Biubiu, where he founded the town of Concepcion.<sup>5</sup> This palisade was surrounded by a moat. The fortifications of the Araukans seem to have had the character of strongholds. As their huts were not collected in villages they could not fortify them. The statement that Valdivia already built palisades shows that the Araukans may have got the idea of building them from the Spaniards. We cannot there-

<sup>1</sup> *Gaspar de Carvajal*, l. c., p. 64.

<sup>2</sup> In the Royal Spanish Academy's *Diccionario de la Lengua Castellana*, 1914, *rabel* (arrabele) is described as a small 3-stringed lute-like instrument, played with a bow.

<sup>3</sup> *Guevara, Tomas*. *Psicología del pueblo Araucano*. Santiago de Chile 1908, p. 135.

<sup>4</sup> *Latcham*, l. c.

<sup>5</sup> »Otra dia por la mañana comencé á entender en hacer una cerca, de donde pudiésemos salir á pelear cuando nosotros quisiésemos, y no cuando los indios nos sollicitasen, de muy gruesos árboles hincados é texidos como seto y una cava bien ancha y hõnda á la redonda;» *Relacion hecha por Pedro de Valdivia al Emperador dándole cuenta de lo sucedido en el descubimiento, conquista y poblacion de Chile y en su viaje al Perú*. Coleccion de documentos inéditos. T. IV. Madrid 1865, p. 52.

fore tell from historical sources if the palisades in Chile are a pre-Columbian cultural element or not.

Europeans seem to have had palisades on the Brazilian coast, too, at a very early time. Thus, Affonso de Sousa<sup>1</sup> mentions that he built a fort surrounded by palisades, about where Rio de Janeiro now lies, in 1531. Other Portuguese probably built palisades along this coast still earlier. In books dealing with these parts I have not found any statement about Indian palisades earlier than Staden's, 1549.<sup>2</sup> From the voyages of Amerigo Vespucci,<sup>3</sup> Cabral<sup>4</sup> and Gonneville<sup>5</sup>, they are not mentioned.

From Rio Parana and Rio Paraguay, from which places Schmidel (1542)<sup>6</sup> mentions palisades, I have been unable to find any statement about them in the oldest literature on these places. Diego Garcia,<sup>7</sup> Sebastian Cabot<sup>8</sup> and Luis Ramirez<sup>9</sup> say nothing about villages surrounded by palisades in these parts, though the last-named has a great deal to say about the dwellings of the Indians there. The fort built by Cabot on the Parana, Sancti Spiritus, does not seem to have been a palisade fortification.<sup>10</sup>

Thus it would seem as if, both on the Brazilian coast and on the Rio Parana, palisades were used by the Indians only after they had been in contact with Europeans for some time. As regards the palisades found in the middle of the 16th century in Chiquitos, and in the beginning of the 18th century among the Baures in what is now Eastern Bolivia, we cannot know if they were genuine Indian or not.

<sup>1</sup> *Lopez de Souza, Pero*. *Diario da navegacao . . . de Martim Affonso de Souza*. Lisboa 1839, p. 25. »Como fomos dentro, mandou capitam J. fazer hua casa forte com cerca por derrador.»

<sup>2</sup> l. c.

<sup>3</sup> *Viages de Americo Vespuccio*. *Martin Fernandez de Navarrete*. Coleccion de los viages y des cubrimientos que hicieron por mar los españoles. T. III., Madrid 1829.

<sup>4</sup> *Navegacao do capitão Pedro Alvares Cabral* escrita por hum piloto portuguez. *Collecção de noticias para a historia e geografia das nações ultramarinas*. T. II, Lisboa 1812.

<sup>5</sup> *d'Avezac, [A.]* *Relation authentique du voyage du Capitaine de Gonneville*. *Annales voyages*. Paris 1869.

<sup>6</sup> l. c.

<sup>7</sup> *Carta de Diego Garcia* 1526. *Revista do Instituto Historico e Geographico do Brazil*. T. XV (2<sup>o</sup> Da terceira serie, 2<sup>o</sup> Edição). Rio de Janeiro 1888.

<sup>8</sup> *Harrisse, Henry*. *John Cabot the discoverer of North-America and Sebastian his* London 1896.

<sup>9</sup> *Carta de Luiz Ramirez* Do Rio da Plata, a 10 de Julho de 1528. Also included Vol. XV of the above-mentioned periodical.

<sup>10</sup> *Harrisse*, l. c. p. 214.

Hojeida presumably built a fortress, which was possibly a palisade,<sup>1</sup> as early as 1502 at Bahia Honda on the Goajiro Peninsula, Columbia; while from the north coast of S. America we have also a still earlier statement to the effect that the Indians used palisades. Near «The Dragons Mouth» Christóbal Guerra came in conflict (1499) with some «Caribes», and freed an Indian captured by them. This man related that these «Caribes», when they went on a plundering expedition in boats, used to build at night a fortification of logs which they took with them, i. e. a palisade.<sup>2</sup> This proves that in this part of S. America palisades were a pre-Columbian cultural element, i. e. if the statement is correct, and Cristóbal Guerra and his men did not misunderstand the captured Indian, whose language must have been strange to them.<sup>3</sup>

Even if the statement should not be correct, it is evident that both in Venezuela and in Columbia palisades are a pre-Columbian cultural element. We must remember that almost in every place to which the first discoverers pushed their way in what is now Columbia, wherever they were the first white people they found the villages surrounded by palisades, and it is difficult to imagine that the idea of building them had spread in the space of a few years over a large tract of the north of S. America.

To this it must be added that the palisades described by Oviedo y Valdés as early as 1530 odd from Venezuela and Columbia, and which consisted of *thick stemmed trees with roots*, could not have been planted in imitation of the palisades of Europeans. These curious natural palisades were certainly not planted after the Indians had been troubled by Europeans, but must date back to more peaceful conditions, as they would take several years to grow up into an effective protection.

It follows that the palisades in Columbia and Venezuela must have been a pre-Columbian cultural element. We do not know

<sup>1</sup> Viages Menores. Coleccion Navarrete, l. c., p. 35.

<sup>2</sup> Navarrete, p. 12. «vgnian á infestar estas tierras con la precaucion de encastillarse de noche en un recinto de estacas que traian consigo, y de allí salir á sus fechorias.»

<sup>3</sup> It may seem incredible that the Indians should have dragged along with them logs for palisades in parts where they presumably had access to woods; but we must remember that they had nothing but fire and stone axes to fell the trees with, and it would therefore be a lengthy and tedious undertaking to cut down and sharpen the piles. In their large «piraguas» they could find room for great quantities of piles, so there is nothing absurd in the statement about portable palisades.

whether they were pre-Columbian on the Amazon and in Eastern Bolivia. On the Brazilian coast, on the Parana, and in Chile they seem, judging by historical sources, to have been *post-* rather than *pre-*Columbian.

It should however be pointed out that none of the many 16th century authors who have circumstantially described palisades from different parts of S. America, make any reference to Indians having taken the idea of building palisades from Europeans. It would also be curious that writers such as Schmidel and Staden, who describe palisades from parts where we have reason to suspect that they are built after European models, should show such a keen interest in them if they had known they were not genuine Indian.

Lery expressly states that the Tupinambá Indians only had their border villages fortified with palisades. It was therefore possible to travel through large parts of their country without seeing a single fortified village. These laborious and difficult undertakings were, as a rule, carried out, we may presume, only when pressing need arose. In some places it would be the attacks of Europeans that forced the Indians to fortify their villages. Simon<sup>1</sup> says about the Cuicos and Timotes Indians near Trujillo in Venezuela, that they built palisades as a defence against the Spaniards, but says nothing about the models being taken from the Spanish. We may therefore come to the conclusion that, as a rule, the Indian villages in the time of the first discoverers were not surrounded with palisades on the R. Parana, on the Brazilian coast and in Chile, but that they were subsequently fortified as a protection against the Spaniards and Portuguese, so that some years later Schmidel and others found them fortified. We may conclude that it was after the Indians had been exposed to the encroachment of the Spaniards and had recognized their power that they built palisades but not because the Europeans had taught them how. They may have known about them before, but it was not until they really needed them that they built them; and the primary cause here was naturally the encroachments of the foreign invaders. In their civil wars they probably had used them before as a means of defence.

One might think that the construction of the palisades could settle the question whether they were built from European models or not. This is not so easy, however, for the trap-holes, moats, and all the details we know about the Indian palisades, were of course

<sup>1</sup> l. c. p. 396.

familiar to Europeans. But was not there some essential difference between the Indian and the European palisades? The facts are about as follows.

The Indians constructed a sparse outer palisade, and a close inner one, while in the European types the piles were apparently always close together. In the Indian fortifications the outer palisade was only intended as a protection against an assault. With the moat, spiny bushes, etc., it served the same purpose as the wire entanglements in a modern war of position. Vargas Machuca,<sup>1</sup> in a book printed in 1599, which tells of how to make war on the Indians, only speaks of palisades with piles placed close together. It is to be remarked that this text-book is from the end of the 16th century, and it is the palisades that the Europeans constructed at the beginning of that century which interest us. But it must also be noted that Valdivia mentions that he built a close palisade surrounded by a moat, while the palisades of the Araukans, which one might think were built on the same model, were quite different. They were double and it is evident that the outer palisade with the trap-holes were intended as a protection against an assault, while the defenders shot through the loopholes from the inner palisade. I therefore think it most probable that the Araukans did not build palisades on the Spanish models, but on those they had learnt from their fathers.

If we assume that the palisades in Chile were a genuine Indian cultural element, they may certainly have been so, too, on the Rio Parana and along the Brazilian coast, where they built palisades of the same type as the Araukans.

*The final result we shall come to is that throughout S. America, wherever this species of fortification was used by the Indians, it was mainly a pre-Columbian cultural element*

We must also bear in mind that the Europeans may very well have built palisades on the Indian model, since they employed Indians to work for them. It was related of Sedeño that with the help of a friend and neighbour, the chieftain Chacomar, and of the other Indians living in their neighbourhood, he built a palisade<sup>2</sup> on

<sup>1</sup> *Vargas Machuca, Bernardo de*. Milicia y descripción de las indias. Colección de libros raros ó curiosos que tratan de América. Tomo octavo, Madrid 1892. p. 214. (First edition Madrid MDXCIX.)

<sup>2</sup> *Simon*, l. c. p. 96.

the Island of Trinidad. It is not impossible that this was planned by Chacomàr, not by Sedeño.

\* \* \*

It lies outside the scope of this article to deal with the occurrence of palisades in Central and North America. A great deal has already been written about such forts in the latter country.<sup>1</sup>

It may, however, be of interest to recall that Thevet mentions the use of poisonous gases among what he calls «the Canadians»,<sup>2</sup> especially as I believe that this is not generally known to students who have been occupied with the ethnography of N. America.

«While awaiting their enemies they fortify their huts and cabins with pieces of wood, faggots and branches, smeared with the fat of the wolf-fish or other fish: and in order to poison their enemies if they approach, they set fire to these, from which issues a coarse black smoke, dangerous to breathe owing to its stink, which is so violent that it kills those who breathe it: besides that it blinds their enemies so that they cannot see each other. And they are able to direct and arrange this smoke in such a way that the wind drives it from them against their enemies. In the same manner they use poisons made of certain leaves of trees, herbs and fruits, which dried in the sun, they mix with the faggots and branches, then set fire to them from afar, on seeing the enemy approach.»<sup>3</sup>

Thevet's account is, no doubt, exaggerated. We can hardly believe that the smoke of the burning fat of fish and of burning plants caused death. It also seems to me inexplicable that the defenders of the villages used the poisonous gases, as in that case the attackers would be immune unless the wind were directly against them.

Thevet says nothing about «the Canadians» having palisades. However, the Indians used them on the St Lawrence, for in 1535 Cartier found the Iroquoian town of Hochelaga (now Montreal) defended by means of palisades, and we may well assume that poisonous gases were chiefly used in fighting for fortified places.

<sup>1</sup> Cf. the article »Fortification and Defense» in the Handbook of American Indians. Washington 1907. (With bibliography.)

<sup>2</sup> «The early French writers used the term 'Canadiens' to designate the Algonquian tribes on or near the St Lawrence, especially the Nascapee and the Montagnais tribes below the Saguenay, as distinguished from the Algonkin and Micmac.» Handbook I. c., p. 198.

<sup>3</sup> *Thevet, André*. Les singularités de la France antarctique. Nouvelle édition. Paris 1878, p. 421. (First edition Paris 1558).

Thevet's description is illustrated by means of a woodcut here reproduced, it being so characteristic, even if its ethnographical value is very slight. Moreover, it is a curiosity. It is supposed to be by the hand of Jean Cousin,<sup>1</sup> the eminent artist.

I have already said that it lies outside the scope of this article to deal with the palisades of N. America. But, to judge from what has been written by others, there seem to have been a number of differences between the palisades of North America and S. America. As far as I know there were no palisades of live, rooted trees in N. America like those on the north coast of S. America described by Oviedo y Valdés and Castellanos. Nor do the palisades in N. America seem to have been surrounded by Trap-holes or moats filled with pointed, occasionally poisoned stakes.

Characteristic of the palisades in the S. E. of N. America was, that they had a single entrance between overlapping ends of the stockade. We have no mention of any such from S. America.

It would also be of interest to study the distribution of palisades in Central America, but I cannot touch on it in this short article, beyond stating that palisades were met with by Grijalva<sup>2</sup> in Yucatan as early as 1518. Their occurrence in the Panama district I have referred to above.

<sup>1</sup> See the Introduction by *Paul Gaffarel* to the reprint of André Thevet's book, 1. c., p. XVII.

<sup>2</sup> *Viages menores. Navarrete*, l. c., p. 57.



Fig. 2. Canadian Indians making a «gas-attack». From Thevet, 16th century.

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