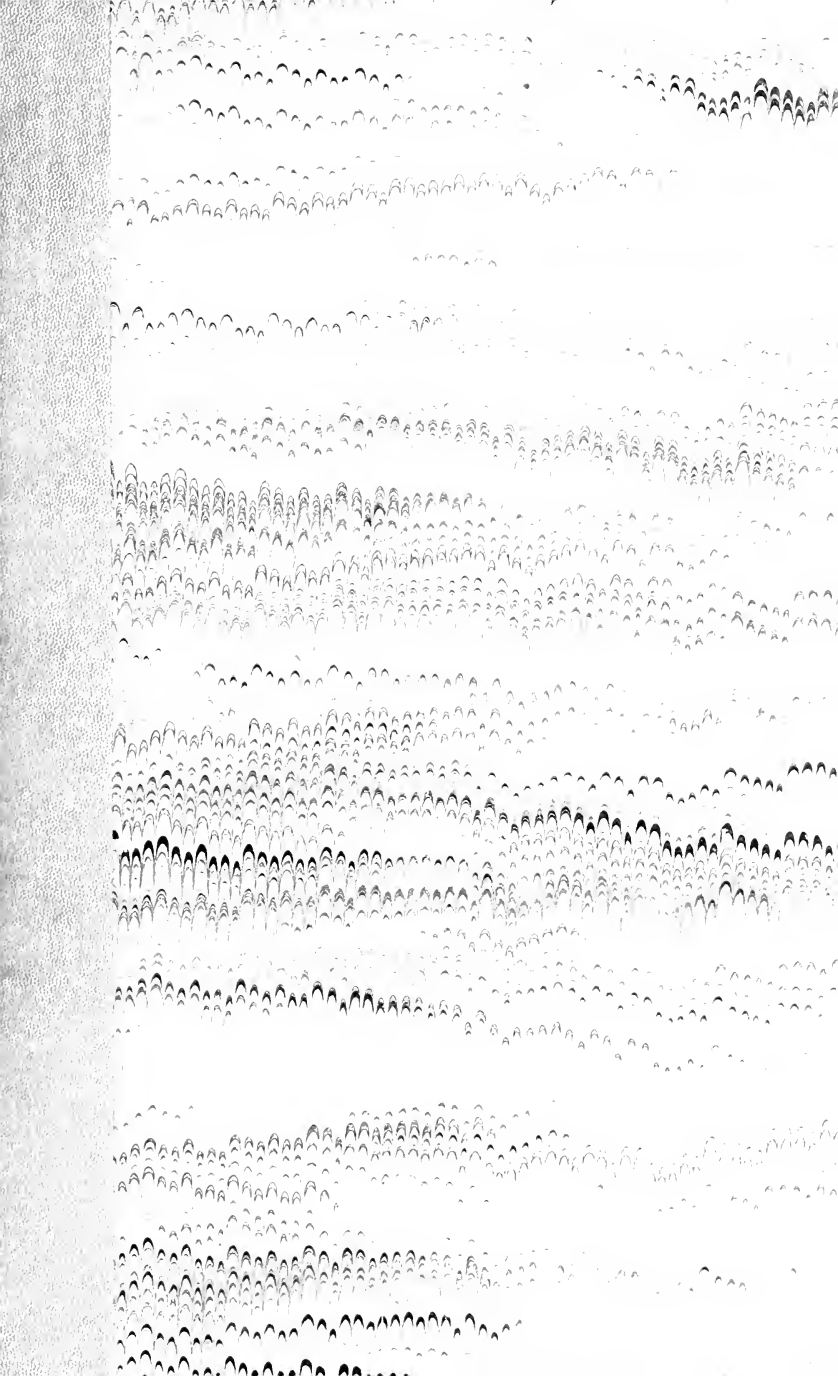

BULLETIN

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BULLETIN

OF THE

ESSEX INSTITUTE.

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HUGO RIED'S ACCOUNT OF THE INDIANS OF LOS ANGELES CO., CALIFORNIA.[1]

WITH NOTES

BY W. J. HOFFMAN, M. D.

THE following epistles were copied by the writer during the summer of the present year, 1884, from the original MSS. in possession of the Hon. A. F. Coronel, of Los Angeles, Cal., to whom they were written in the year 1852 by the late Hugo Ried from the San Gabriel Mission where the author lived at that time. These epistles were intended as a contribution to "A History of the Indians of Los Angeles Co.," but of the original thirty-two only twelve refer to the subject in detail, the remainder consisting of information relating to the establishment, and decline, of the Franciscan Missions in California, facts with which we are already familiar through other sources.

Some of the epistles are variously signed "Hugo Ried," and "P. Hugo Ried," though the writer could not ascertain which was correct. The author, so Mr. Coronel states, was a Scotchman of considerable intelligence, who, after meeting with disappointment in an *affaire de cœur* in Sonora, came to the San Gabriel Mission, married an Indian woman of the tribe located there, and remained,

literally cut off from the outside world until the day of his death.

With the exception of a few preliminary remarks, not germane to the subject under consideration, the epistles are given *verbatim et literatim*. Unless otherwise stated, the pronunciation of words, and letters, is in accordance with the Spanish language. The superior figures (as [2]) in the text refer to the notes at the end of this article. The writer is responsible for all remarks in brackets.

LETTER I.

The following are the rancherias with the corresponding present names:

Yang-na	Los Angeles
Sibag-na	San Gabriel
Isanthcog-na	Mision Vieja
Sisit canog-na	Pear Orchard
Sonag-na	Mr. White's Place
Acurag-na	The Presa
Azuesag-na	Azuza
Cucomog-na	Cucamonga
Pasinog-na	Rancho del Chino
Pimocag-na	Rancho de Ybarra
Awiz-na	La Puenta
Chokishg-na	Iaboneria
Pimug-na	Island of Santa Catalina
Toybipet	San José
Hutueg-na	Santa Ana (Yorbas)
Almpquig-na	Santa Anita
Maug-na	Rancho Felis
Hahamog-na	Rancho Verdugos
Cabueg-na	Cabuenga
Paseeg-na	San Fernando
Suang-na	Suanga
Pubug-na	Alamitos
Tibahag-na	Serritos
Chowig-na	Palos Verdes
Nacaug-na	Carpenter's farm
Kinkipar	Island of San Clemente

Irup and San Bernardino, etc., belonged to another distinct tribe possessing a language not at all understood by the above lodges, and although reduced by the Spanish Missionaries to the same labor and religion, they never amalgamated their blood, they being considered as much inferior, and named *Serranos* or Mountaineers.

The captains or chiefs of each lodge took its name followed by *ic*, with sometimes the alteration of one or more final letters. For instance, the chief of Azucsagna was called *Azucsavic;* that of Sibagna, *Sibapic.*

The title of a chief's eldest son was *Tomeár;* of his eldest daughter, *Manisar.*

Suanga was the most populous village.

The Cahuillas were named by the Spanish missionaries; thus misnamed as a tribal name, the word *cahuilla* signifying *master.*

LETTER II.

They have a great many liquid sounds and their gutturals are even softened down as to become agreeable to the ear. In the following examples *i* has the sound of *ee;* *u* of *oo;* *e* of *a* as in fare; *a* of *a* as in father; *ay* of *i;* *gn* as in French.

Numerals.[2]

1 Pucu
2 Wehe
3 Pahe
4 Watzu
5 Mahar
6 Babahe
7 Watza caviá
8 Wehez watza
9 Mahar caviá
10 Wehez mahar
11 Wehez mahar coy pucu [coy-*and*]
12 Wehez mahar coy wehe

20 Wehez wehez maghar [*g* and *h* combined][3]
30 Pahez wehez maghar
40 Watzahez wehez maghar
50 Mahares wehez maghar
100 Wehez wehez mahares wehez mahar

Once	Pucushe
Twice	Wehez
Three times	Pahez
Four times	Watzahez
Five times	Maharez
Ten times	Wehez maharez
There is / There are	Woni
There is none / There are none	Yahez
Yes	Ehez
No	Hay
Presently	Wake
Before	Aunuco
To-day	Mitema
Yesterday	Poana
To-morrow	Yamte
Here	Ycuaro
There	Muro
Far off	Poane
I	Noma
Thou	Oma
He or she	Mané
Man	Woroyt
Woman	Tocor
Boy	Quité
Black	Yupiha
White	Arawatay
Red	Quaoha
Blue	Sacasca
Yellow	Payuhuwi
Green	Tacape
Sun	Tamit
Moon	Moar
Stars [*sic*]	Zoot
Dog	Wozi
Coyote	Ytur
Bear	Hunar
Deer	Zacat

To hear,— Nahacua.

1.	Nonim nahacua,	I hear.
2.	O-a nahacua,	Thou hearest.
3.	Mané nahacua,	He or she hears.
1.	Non him nahacua,	I heard.
2.	O-a him nahacua,	Thou heardest.
3.	Mane him nahacua,	He or she heard.
1.	Nop nom nahacua,	I shall hear.
2.	O-pam nahacua,	Thou shalt hear.
3.	Mane-pom nahacua,	He or she shall hear.

To speak,— Sirauaj.

1.	Non-im sirauaj,	I speak.
2.	O-a sirauaj,	Thou speakest.
3.	Mane sirauaj,	He or she speaks.
1.	Non him sirauaj,	I spoke.
2.	O-a him sirauaj,	Thou spokest.
3.	Mane him sirauaj,	He or she spoke.
1.	Nop nom sirauaj,	I shall speak.
2.	O-pam sirauaj,	Thou shalt speak.
3.	Mane pom sirauaj,	He or she shall speak.

They have no word to express *love*, but terms as *to have affection for* or *to regard*. The nearest approach to express the idea of love is *uisminoc*.

[Present tense.]

Sing.

1. Nonim uisminoc.
2. O-a uisminoc.
3. Mané uisminoc.

[Past tense.]

1. Non him uisminoc.
2. O-a him uisminoc.
3. Mane him uisminoc.

[Future tense.]

1. No que im uisminoc.
2. O-que-a uisminoc.
3. Mane que uisminoc.

LETTER III.

The Santa Inéz tongue is understood by the Indians of the Purissima, Santa Barbara[4] and San Buenaventura, with this difference, that the two latter splutter their words a little more, which almost seems impossible! The *l* is used in this tongue, although not in the Gabrielino, which is strange. The only word in the Gabriel tongue which has an *l* is an interjection, *alala*, equal to Oho! The Serranos have no *l* either, in use, and their language is as easy as that of San Gabriel.

The Serranos generally employ a *t*, when the Gabrielinos would use an *r*.

LETTER IV.

Gabrielino.

Father, mother, husband, son, daughter, face, hair, ear, tongue, mouth and friend, are words never used without a personal pronoun, as:

Father, *nack*, my father, *ni nack*, thy father, *mo nack*, his or her father, *a nack*.

Husband and wife. If they have had children, instead of saying *ni asum*, my husband, they often say *ni táliaisum*, which may be translated *part of my body*.

All brothers older than the speaker are styled *apa; ni apa*, my brother; all younger, by *apeitz; ni apeitz*, my younger brother. They have no word to express Indian. Tahat signifies people. The whites are termed *chichinabro*, reasonable beings.

Face and eyes are expressed by the same word.

Ear, *nanah;* the leaves of a tree are called its ears.

Snow and ice are the same.[5]

Tobagnar, the whole earth; *lahur*, a portion of it, a piece of land.

Caller, forest. No word to signify tree, all varieties have their special names.

Cabatcho, good looking.

Zizu, devil, an evil spirit.

Ayopu-cushna, brother-in-law.

Qua-o-ar, God. Held in great reverence, and the name was seldom pronounced among them. They generally used the term, *Y-yo-ha-riv-gnina*, that which gives us life.

LETTER V.

Government, Laws and Punishment.

The government of the people was in the hands of the chiefs, each captain commanding his own lodge. The command was hereditary in a family, descending from father to son, and from brother to brother. If the right line of descent ran out, they immediately elected one of the same kin nearest in blood. Laws in general were made as they were required, with the exception of some few standing ones. Robbery and thieving were unknown among them, and murder, which was of rare occurrence, was punished by shooting the delinquent with arrows until dead. Incest was held in deep abhorrence and punished with death; even marriages between kinsfolk were not allowed. The manner of death was by shooting with arrows.

All prisoners of war were invariably put to death, after being tormented in a most cruel manner. This was done in presence of all the chiefs, for as war was declared and conducted by a council of the whole, so they had to attend to the execution of enemies in common. A war dance, on such an occasion, was therefore grand, solemn and maddening.[6]

If a quarrel ensued between two parties the chiefs of

the lodge took cognizance in the case and decided according to the testimony produced. But if a quarrel resulted between parties of distant lodges, each chief heard the witnesses produced by his own people, and then in council with the chiefs of the opposite side they passed sentence. Should they disagree, another chief, impartial, was called in who heard the statements made by the two captains, and he decided alone. There was no appeal from his decision. Whipping was never resorted to as a punishment, restitution being invariably made for damages sustained, in money, food and skins.

If a woman proved unfaithful to her husband and he caught her in the act, he had a right to put her to death, if he chose, without any interference by any of the tribe. But what was more generally practised, he informed the paramour he was at liberty to keep her, and then he took possession of the other's spouse. The exchange was admitted as legal by all concerned, and the paramour would not object.

Although they counted by moons, still they had another mode for long periods, which was to reckon from the time the sun was farthest north, till he was at his southern extremity, and then back again. Summer was counted from the time frogs were first heard to croak. This was used to count war scrapes by, and under the recollection of the chief. When other tribes had to be chastised, the chief sent an express to all other lodges. They brought up from children a number of males, who were taught to hear long stories by the chief and to repeat them word for word. In this manner they became so perfect as to be able to recite the longest oration any one could produce.

They were not much given to travel, for they only relate of *one* who left his people and proceeded north till he

came to the land where the geese breed. And even he appears to have possessed that property ascribed to his race, for on his return he informed them of having fallen in with people whose ears reached down to the hips; others of a small stature; and finally a people so perfect that they would lay hold of a rabbit or other animal, put it near the mouth, draw a long breath and then throw the rest away; which on examination was nothing but excrement! They sucked with their breath the essence of the food and so lived without any calls of nature.

LETTER VI.

Food and Raiment.

The animal food used by the Gabrielinos consisted of deer meat, young coyotes, squirrels, badgers, rats, gophers, skunks, raccoons, wild cats, the small crow, blackbirds and hawks, and snakes, with the exception of the rattlesnake. A few eat of the bear, but in general it was rejected on superstitious grounds. The large locust or grasshopper was a favorite morsel, roasted on a stick at the fire. Fish, whales, seals, sea-otter and shell-fish formed the principal subsistence of the immediate coast range lodges and Islanders. Acorns, after being divested of the shell, were dried and pounded in stone mortars, put into filterers of willow twigs worked into a conical form and raised on little sand mounds, which were lined inside with two inches of sand; water added and mixed up; filled up again and again with more water, at first hot, then cold, until all the bitter principle was extracted; the residue was then collected and washed free of any sandy particles it might contain; on settling, the water was poured off; on being well boiled it became a sort of mush, and was eaten when cold. The next favorite food was the kernel of a species of plum which grows in the

mountains and islands. It is sometimes called the mountain cherry, although it partook little of either, having a large stone wrapped in fibre and possessing little pulp. This, cooked, formed a very nutritious, rich, sweet aliment and looked much like dry frijoles. *Chia*, which is a small, gray, oblong seed, was procured from a plant apparently of the thistle kind, having a number of seed vessels on a straight stalk, one above the other like sage. This roasted and ground made a meal which was eaten, mixed with cold water, being of a glutinous consistence and very cooling. Pepper seeds were also much used, likewise the tender tops of wild sage. Salt was used sparingly, as they considered it having a tendency to turn the hair *gray*. All of their food was eaten cold or nearly so.

The men wore no clothing; the women of the interior wore a short waist skirt of deer-skin, while those of the coast had otter-skin. Covering for sleeping consisted of rabbit-skin quilts.[7] The women wore ear-rings, the men passing a piece of cane or reed through the ear lobe. The ear-rings of the women were composed of four long pieces of whale's tooth ground smooth and round, about eight inches in length, and hung, with hawks' feathers, from a ring of abalone shell. Their necklaces were very large and heavy, and consisted of their money beads, of beads made of black stone[8] and pieces of whales' teeth, ground round and pierced. They used bracelets of very small shell beads on both wrists.

LETTER VII.

Marriages.

Chiefs or captains had one, two, or three wives, as their inclinations dictated. Their subjects only one. When a person wished to marry, and had selected a suit-

able partner, he advertised the same to his relations. On the day appointed, the male portion of the lodge and male relations living at other lodges, brought in their contributions of shell-bead money, generally to the value of twenty-five cents each. The contribution ready, they proceeded in a body to the residence of the bride where all of her relations were assembled. The money was then divided equally among them, the bride receiving nothing, as it was a purchase. After a few days, the bride's female relations returned the compliment in taking to the bridegroom's dwelling baskets of meal made of Chia, which was distributed among his male relations. These preliminaries over, a day was fixed for the ceremony, which consisted in decking out the bride with innumerable strings of beads, paint and skins. Being ready, she was taken up in the arms of one of the strongest of the tribe who carried her, dancing, towards her sweetheart's habitation, all her family connections dancing around and throwing food and edible seeds at her feet at every step, which were collected by the spectators as best they could in a scramble. The relations of the groom came and met them, taking away the bride from the carrier and doing the duty themselves, as likewise joining in the ceremonious walking dance. On arriving at the bridegroom's lodge, who was within waiting, the bride was inducted into her new residence, placed beside her husband, and baskets of seeds emptied on them to denote blessing and plenty. These were likewise scrambled for by the spectators, who, in gathering up all of the "seed cake," departed, leaving them to enjoy their honeymoon according to usage. The bride never visited her relations from that day forth, but was at liberty to receive their visits.

Should the husband beat the wife and ill-treat her, she gave advice of it to her lodge, when her relations col-

lected all the money which had been paid at her marriage, took it in deputation to the husband's lodge, left it with him and led off the wife, whom they married immediately to another.

LETTER VIII.

Birth and Burial.

Immediately on the birth of a child, the mother and infant were purified, in the following manner: In the centre of a hut a large hole was dug, and an immense fire was kindled in which large stones were heated until red-hot. When nothing remained but hot embers and the stones, bundles of wild tansy were heaped on the same and covered all over with earth, with the exception of a small chimney or aperture. The mother had then to stand over the aperture with her child wrapped up in a mat, flannel fashion; water was then poured by degrees in at the opening which caused immense quantities of steam or vapor, causing the patient to hop and skip a little at first and provoked profuse perspiration afterwards. When no more steam was procurable, the mother and child lay down on the heap, covered up, until the steaming was renewed again. Three days was the term of purification, morning and evening being the times of sweating. No food was allowed the mother during that time, and her drink (water) was warmed. She was now allowed to eat of everything at discretion, with the exception of animal food, which was debarred her for two months. Her diet at length complete, three pills were prepared of the size of a musket ball composed of one part of meat and one part of wild tobacco. These swallowed, she was allowed to eat meat; but she was not permitted to share her husband's bed until the child was able to run.

When a person died all the kin collected to lament and mourn his or her loss. Each one had his own peculiar mode of crying or howling, and one could be as easily distinguished from the other, as one song from another. After lamenting awhile, a mourning dirge was sung in a very low tone, accompanied by a shrill whistling by blowing into deers' bones. Dancing can hardly be said to have formed a part of their rites, as it was merely a monotonous action of the foot by stamping on the ground. This was continued until the body showed signs of decay, when it was wrapped up in its covering with the hands across the breasts and tied from head to foot. A grave having been dug in their burial place, the body was interred according to the means of the family, by throwing in seeds, etc.[9] If deceased was the head of a family, or a favorite son, the hut was set fire to, in which he died, and all of his goods and chattels burned with it, reserving only some article with which to make a feast at the end of twelve months.

LETTER IX.

Medicine and Diseases.

Medicine men[10] were esteemed as wizards and seers, for they not only cured disease, but caused disease and poisoned people; made it rain when required; consulted the Great Spirit and received answers; changed themselves into the form of diverse animals, and foretold coming events.

The medicine man collected the poison used for dipping the heads of arrows. Fire was supposed to destroy its hurtful properties, consequently the flesh of animals so killed were eaten without any misgivings. The Seers pretended not only to know poisons which destroyed life by giving it internally, but also others which the simple

touch was sufficient to produce the desired effect; and that some were instantaneous, and that others required one, two, or even twelve months before action took effect.

Rheumatism comprised nearly all the general complaints. Syphilis[11] was unknown. Toothache seldom troubled them. Rheumatism was treated by applying a string of blisters, each the size of a dime, to the affected part. The fur off the dry stalks of nettles was used for blistering; this was rolled up, compressed, and applied with saliva; then fire was applied, when it burned like punk; as one was extinguished, another was lit. For lumbago, they drank of a sweating herb and lay down for twenty or thirty hours in hot ashes. Fever was treated by giving a large bolus of wild tobacco mixed with lime (of shells), causing vomiting, besides other herbs and manipulations of the Seer.

Local inflammation was scarified with pieces of sharp flint and procuring as much blood as possible from the part. Paralysis, stagnation of the blood, etc., was treated by whipping the part or limb, with bunches of nettles for an hour or two, likewise drinking the juice of thorn apple which caused ebriety for two or three days. Decline (of rare occurrence) was treated by giving the cooked meat of the mud turtle for a period of time.

Shell lime was well known, but none made from limestone. For an emetic, it was mixed with wild tobacco and taken immediately in bolus, but in a more agreeable form it was pounded up and formed into a cake, and used in fragments as required.

Strangury was treated by sweating, as in the lying-in woman, only marsh mallows were employed instead of tansy; then a large bolus of chewed tobacco produced general laxation and prostration which often produced relief at once. If this failed, drawing blood by sucking

the abdomen immediately above the bladder hardly ever failed to give relief. This operation was performed with a great many rites, prior to the suction, such as smoking to the Great Spirit, pressure and frotation [*sic*] of the abdomen with the hands, and a song at the end of every verse concluded with the words

Non im mainoc, ni mainoc,
Non im mainoc, ni mainoc,
Yobare!
"I do, what I am doing,
I do, what I am doing,
Oh Church!"

Bites of snakes were cured by the application of ashes and herbs to the wound, and herbs and ashes and the fine dust found at the bottom of ants' nests given internally.

Red clay was sometimes applied to the hair, covering it all over, and allowing it to remain for twenty-four hours when it was washed off, to prevent the hair from splitting.

Chilicotes were burnt to charcoal and applied morning and evening to cure baldness.

LETTER X.

Tradition.

There were *seven brothers* who married *seven sisters* — according to their respective ages — who lived in a large hut together. The husbands went daily to hunt rabbits, and the wives to gather flag-roots, for food. The husbands invariably returned first, and on the wives' arrival reported always bad luck in hunting, with the exception of the youngest brother who invariably handed his wife a rabbit. Consequently the poor women fared badly in regard to animal food. This continued as a daily occurrence for a length of time, until in a conference held by

the women they expressed a conviction of being cheated by their husbands, declaring it strange that with the sole exception of the youngest husband, nothing was ever killed. At the same time to find out the truth, they agreed that the youngest should remain at home the following day under pretence of toothache and watch the return of the party. Next day the men as usual took their bows and arrows and set forth. The six sisters then departed, leaving the other hidden among flags and rushes at the back of the house, in such a position as to command a view of everything transacted within. Several hours before sunset the hunting party returned laden with rabbits, which they commenced roasting and eating, with the exception of one which the youngest put apart. The others called him a fool, telling him to eat the rabbit, which, however, he refused to do, saying he esteemed his wife a little and always intended to reserve one for her. "More fool you," said the others, "we care more for ourselves than for them." The feast concluded, the bones were carefully gathered together and concealed in a suitable place outside. After some time, the youngest wife arose and presented herself in the hut, to the surprise of the males, who asked her where she came from? "I have been asleep at the back of the house," answered she, "and I have only this minute awoke, having had to remain behind from toothache." After a while the women came home, who ran to their sister asking for her health. They soon found an opportunity to leave the hut and learn the results of the espionage, besides visiting the place where the bones were deposited. They cried very much and talked over what they should do. "Let us turn to water," said the eldest. This was objected to by all the rest, saying that their husbands would then drink them, which would never do. The second proposed that they

should turn into stones, which was likewise rejected, because they would be trod upon. The third wanted them to turn into trees; rejected, as their husbands would use them for firewood; and so on until it came to the turn of the youngest, who proposed they should change themselves into stars; an objection was made on the ground that their husbands would always see them, which was at length overruled from the circumstance of being out of reach. They accordingly went to the lagoon where they procured flagroots, and making an engine (flying concern) out of reeds, they ascended to the sky and located themselves as the seven stars.

Only the youngest brother appeared to be vexed at the loss of his wife, and sought her daily. One day, having wandered to the edge of the lagoon, his wife had compassion on him and spoke, directing his attention to the machine they had made, telling him to ascend. He did so, but not wishing him in their immediate vicinity, he was placed a little way off.

A song survives, having reference to the *seven stars*.

LETTER XI.

Sports and Games.

Few games, and of a gambling nature. The principal one was called *churchúrki* (or peon, Spanish). It consists in guessing in which hand a small piece of stick was held concealed, by one of the four persons who composed a side who sat opposite to each other. They had their singers who were paid by the victorious party at the end of the game. Fifteen pieces of stick were laid on each side, as counters, and a person named as umpire, who, besides keeping account, settled the debts and prevented cheating, and held the stakes. Each person had two pieces of wood, one black and one white. The white

alone counted, the black being to prevent fraud, as they had to change and show one in each hand. The arms were crossed and the hands hidden in the lap; they kept changing the pieces from one hand to the other. Should they fail to guess right, he lost his peon, and counters allotted to the others, and so on until the counters were gone, or all the peons killed, when the others had a trial. They bet almost everything they possess. The umpire provided the fine and was paid by the night.

Another game called *charcharake* was played between two, each taking a turn to throw with the points down eight pieces of split reed, eight or ten inches long and black one side.

Another game, called *hararicuar*, consisted in throwing rods or canes of the length of a lance, at a ring put in motion, and see who could insert it. The ring was made of buckskin with a twig of willow inside, and four inches in diameter. This is not played now.[12]

Football was played by children and by those swift of foot. Betting was indulged in by the spectators.

LETTER XII.

Legend.

In Muhuvit,[13] which lies behind the hills of San Fernando, a woman married a captain of Verdugas. The woman was very stingy and selfish, and when the people brought them roasted rabbit, she devoured it alone and never invited any one to eat with her. The young chiefs would surround her, but she never invited any of them. They returned to their houses, and when their mothers inquired if they had partaken of the feast, said no. Then the people got angry about it, and asked the husband to send her home again to her mother. She, by this time, had a daughter. Old men spoke with him;

do what you like, said the husband. The old men accordingly ordered the people to hunt rabbits as usual, but to stuff them, before roasting, with pieces of wet buckskin, lizards, and other unpalatable reptiles. They did so before giving the repast. The old man asked of the chief, what was to be done with the daughter, whether to take her away or not? "Leave her," said he, "to die with her mother." This day, however, she invited her spectators, for on taking out the leg of a toad, she inquired what it was? "It is a quail," she was answered. "Eat it thou, then," said she, and so she proceeded, taking out strange substances and giving them away. An order was likewise given to refuse her water, and being very lazy, it was presumed she would not go to the spring. The repast gave her great thirst. "Give me water!" but none was procurable. She proceeded from hut to hut, with like success, until she arrived at the last, where a large basket of urine was prepared for her; she nearly finished it at three sups, only leaving a little for her daughter. This occurred every day; at the end of ten days, all her hair fell out, and from being very pretty, she became old and wrinkled. Seeing herself in such a state, she determined to return to her father, and taking her daughter in her arms, she left; but on the road, she repented, having taken her daughter, and said, "What a fool I am to be carrying this load, as if they liked me so much." So she threw it away. After going some little distance she looked back and seeing the little infant stretch out its little arms to her, her heart softened, and she exclaimed, "What fault has it committed?" she turned back and took it up again. She went on and on until she got so weak she could go no farther; at last she was at a great rock, when she took the child by the heels and dashed its brains out, the blood of which is still visible at this day.

Many affirm the child did not die but turned into a squirrel.

Then the mother went on alone until she came to the place where her mother usually kept her seeds and acorns, and lay down with the *Charnuca*. At length her mother came to take out food, and on putting in her hand gave a loud cry and jumped back. "Yes, be afraid of me," said the daughter, "after all the injury you have heaped on me by marrying me to a man who did not care for me." The mother then heard the story, and left to inform the father, taking him out of the hut so no one might hear it.

The father proceeded with his wife to take food to their daughter, and every day they brought her the same, and herbs to drink so as to restore her to health and purge her of the filth she had eaten; also to restore her hair and eyebrows, which she had lost, they applied the fat or oil of the *hamisar*, a black berry. In three moons she was well again, fat, young and beautiful, hair nearly equal to her father's and brother's, which reached to the ground. She was commanded then by her father, to go and bathe herself daily in her brother's bathing place. She did so, and the brother from seeing the water when he came, not limpid as usual, suspected something. At last coming one day, shortly after the other had done, he was convinced, and more so on finding a hair half the length of his own. This troubled him much, that others were bathing in his well, and he became sad. At last, arriving one day, he caught her in the bath, and saying, "so it is you who daily dirty the water of my well," caught her by the leg and threw her out; she fell back and he beheld her nakedness. This caused her so great grief and shame, that she left and proceeded to the seashore to drown herself. She made a run twice to throw herself into the sea but each

time turned back, but the third [*sic*] time accomplished it.

The brother returned to the house and told his mother of having found an unknown woman in his bath and threw her out of it and saw her nakedness. The father and mother left the hut together, and on seeking their daughter could not find her. "She has gone from shame," said the mother; "Where shall we find her?" The father took the twig of a willow, made a ring of it, and covered it with buckskin; this was thrown to the north, it returned again; he threw it to the south, and the same result; he then threw it east; then west, the ring following all the turnings and windings of the daughter. The father followed the ring until it came to the seashore. "She has drowned herself," said he, when he saw the ring enter the ocean. He returned, debating with himself whether it was better to punish his son first, or the chief of Verdugas; he determined on the former first. On arriving home he told his wife who cried bitterly, which amazed the people much. Calling together all of his people, he told them they must take his son with them on a hunting excursion and let him be killed by wild beasts. His son was accordingly decked out in all his ornaments and money beads and told to go with the people hunting, when they were to stay out all night. He went, and they slept out, and the next morning a fire was kindled at which all were warming themselves. One of the old Seers had brought a screech owl with him, hidden, which was no other than the father of the boy, which he let out and frightened all the people who ran off leaving the boy alone, when a large bird, the *Cuwot* (cry *cu*, nothing of which, save its shadow, had ever been seen), said to be the boy's father in another form, came and took him up. Then the people came back crying, "the *Cuwot* has carried off the chief's son." As they came up, the bones came

tumbling down from above. The bones were then buried and the people returned to their huts.

Shortly afterwards, the chief saw some one coming and went to meet him; "Where are you going, where are you from?" "From Verduga." "Oh!" said the chief, "How are you getting on there?" "Very well, the chief is getting another wife, and a great feast is preparing." "Be it so," said he, "they have laughed much at me, now *we* shall laugh and all perish together. What were they doing when you left this morning?" "The women had all gone to gather prickly pears." Hearing this, he went to where the women were gathered, and said, "What are you gathering so many prickly pears for?" "For the feast," said they, "as the captain is to be married." "Take a sieve," said he to an old woman, "and fill it with tuñas[14] and sift the fine thorns into my eyes." She refused; he insisted and the others told her to do as commanded. He opened his eyes wide and she commenced, when all of the women set up a wail at once. They were blind. He burst out laughing and said, "Now I laugh, it is my turn now." He left them and went to where the feast was prepared, and going round to the west side changed himself into a huge eagle and went, low down, to where the feast was. On seeing an eagle come, they cried out, "Catch it, catch it!" with the exception of an old woman who was taking care of her grandchildren during her daughter's absence, who immediately covered the children with a blanket, and cried out to the people not to touch the eagle, as it was a human being and not a bird. The people only called her an old liar, and proceeded to catch it, which they did. "Let us pull its wings off," said they, and they did so. Blood gushed out from one side and green matter from the other. Fever and bilious vomiting commenced among them, and killed

all of the people but the old woman and her two grandchildren. The old woman had to bury the dead the best way she could and to burn the things. The eagle soared up above and never more was heard of.

The old woman brought up the young ones, and when old enough, she constructed a bow with arrow for the boy, and a batea for the girl, teaching the one how to shoot and the other to clean seed. The boy, at last, killed first a lizard, then a mouse, then a gopher. When old enough she married them, but shortly after the girl turned out bad; at first she gave the old woman to eat, but afterwards she refused to give her any meat brought by the husband. The old woman, to be revenged, took an awl made of deer's bone and placing it where the other sat, she hurt herself; she put it into the bath, and again hurt herself. When her husband came home she acquainted him, saying, "I have had injury done me twice, and know I have to die; at any time you are out in the hills and I die, you will know it by feeling some drops of water falling on your left shoulder." Not long after, when out hunting, he felt the drops as he had been told he would. He threw the bow and arrows away and hastened home. In the meantime the old woman had burned and buried the body. "Where is my wife?" "I have buried her." "Thou hast done this and shalt die for it;" taking up a billet of wood to knock her brains out, when she changed into a gopher and hid in the ground. The husband remained three days and nights by his wife's grave. On the third day he saw a small whirlwind arise which soon gave out, then another a little larger, and a third, still larger, came out of the grave, and he arose and followed it. After going a long distance he perceived footprints on the ground where it passed over. "This is my wife's," said he, and he followed an immense distance, and a voice from

the whirlwind addressed him and said, "Return to your hut." "No," said he, "I intend going with thee forward." "That cannot be," said the spirit, "for I am not as formerly. I am dead to the world, and you cannot go, for no human being can go where I am going, nor can earthly eyes behold our figures; therefore return." He would not. "Well," said the voice, "how can I take thee, there is an immense sea to pass." At last finding him positive, she bound him to her waist with her sash, telling him to hold his breath as they went through the air. They arrived at last in the land of spirits where he could see nothing like human forms, and only heard innumerable voices, exclaiming, "What a stench of something earthly, you must have brought that." The wife acknowledged she had, but exculpated herself on the ground that the being she brought was a superior one, being not only a great hunter, but could do anything. "Return him to the earth again, take him away," exclaimed the voices. But one voice at length said, "Let us try him first and see what he can do." He was ordered to climb a pole of great length, and bring down a feather from the top. He felt afraid to ascend, but his wife told him to try, but not to look down while doing so. He accomplished the feat and there was great applause, when the voices cried out *ayopui-cushna* — our brother-in-law — is good at climbing. He was then given a long hair and told to split it from end to end. This again made his courage fail, but his wife told him to do it and to have faith. He had faith in her word and the hair split from end to end with ease. "Well done, our brother-in-law," exclaimed the voices. He was told to make a map of the constellation of Ursus Major and show the position of the North star. He felt great fear to attempt this as he had seen the Seers do this but had never learned it himself. His

wife again aided him and he came out triumphant. They then wanted to test his hunting powers, and four of them were dispatched to drive the deer into his range. He soon heard loud cries of "Brother-in-law, there go the deer," but no deer could he see. The spirits ridiculed his hunting. Another trial was made with the same result. At last his wife told him he would be given a third trial and that he must kill this time. "How can I kill deer if there be none," he said. "Did you not perceive black beetles?" said his wife. "Yes." "Well, those are deer; things are different here to what they are on earth, kill them." They went on their third hunt, and hearing the cry of "There they go," he saw black beetles coming on the sands. He drew his bow, shot at, and killed one; it was converted immediately into a fine, fat buck; this encouraged him, and he slew right and left, until the spirits told him to desist. The game was carried home, he saw the deer lifted from the ground and carried in the air, though he could not see the carriers, although he could perceive their shadows. Great joy was manifested by all at his success. "Sister," said the other spirits to his wife, "no one has ever been permitted to return to earth, as thou knowest, but as our brother-in-law is so good and he cannot participate in our company of those joys and pleasures we partake, and on account of the gross materials of which he is formed, out of compassion to him, return again to earth." And addressing him they said, "Brother-in-law, return again to the earth with thy wife, but for three days thou art not permitted to cohabit with her, after that time thou art free, but a noncompliance will be attended with disappointment." They left the spirit realms and travelled on earth towards their home, the wife still invisible. At night he built a large fire and lay down; on awakening before daylight he saw

his wife lying at a short distance. They travelled the second day as before and at night he again made a fire; on awakening he again beheld her, and although he had rebellious thoughts, still he restrained himself, for he thought that only one day more and he should triumph. The third day also passed in travel and on awakening that night he saw his wife more distinctly than ever; love for her was this time more powerful than reason; the three days are assuredly expired by this time, and he crept towards her. He laid hold of the figure and found an old rotten trunk of a tree in his arms. He remained a sorrowful wanderer on earth till his death.

Whenever this legend was to be told, the hearers first bathed and washed themselves, then came to listen.

The bird Cuwot is still believed in. It is nocturnal in its habits, never seen, but sometimes heard. Its cry was simply Cu. It is said that a man was once carried away by it from the Lodge of Yan (Los Angeles).

Some state that the return of the woman to life after the soul had fled, could not have happened. It being only a compassionate ruse to get the husband back to earth, to return again at a proper time in the form of a celestial being.

NOTES.

1. Refers in particular to the sub-tribe located in the vicinity of San Gabriel, usually termed Tobikhar, and known as the Kizh of former investigators. The subdivisions of the Kanvuya tribe are only recognized on account of dialectic differences. The tribe is one of the group composing the Shoshonian linguistic family, and formerly extended from the coast to the Colorado river, and from near San Diego, northward to the San Fernando mountains. Later, the tribe was divided into the *Serranos*, or mountaineers and *Playsanos*, or lowlanders. Of the latter are the Tobikhar.

The language is still spoken by a number of people, notwithstanding statements made to the contrary. The words Cahuilla and Coahuilla should be abandoned, as they are liable to cause confusion with a similar name, of a distinct stock, in Mexico. The word Verdugos also occurs as Verdugas, in Letter XII.

2. The herds of cattle and horses owned by the Missions were grazed in favorable localities, each herd being under the control of a chief herder and the necessary number of assistants. The chief herder's duty was, also, to have every animal branded, a record of which was kept in the shape of a notched stick, or *Rali*, which was regularly submitted to the *major domo* of the Mission. Fig. 1 represents a stick of this kind, now in the collection of Mr. Coronel of Los Angeles.

The stick is about twenty-four inches in length, and three-fourths of an inch thick in diameter, each way. The handle has the edges bevelled and upon each of the four faces thus produced are the characters I, II, X, ⋗, signifying respectively bull, cow, heifer and ox. For cattle, the end opposite the handle is notched, thus giving the rude idea of horns. For horses, the end is pointed, in imitation of the sharp ear of a horse. When the stick is used by a herder of horses, the same marks are used, upon the handle, as for cattle, but with the signification, in order, as follows: stallion, mare, colt, gelding. Whenever an animal is branded, a notch is cut into the sharp edge of the proper stick, and upon the line of the character on the handle to designate the sex or age of the subject. Thus an accurate record was kept of all stock handled, a custom and method which was copied by the Mexican herders and retained until a few years ago.

Notched sticks were also used by the herders and laborers to record their accounts with the *major domo*. These sticks were nicely worked out of dogwood, polished, though not quite as long as the above. Only two sides were used, one bearing the character ⊠, for money, and a simple line cut crosswise, for work. On the money side there were notches for *reals* and long cuts, extending across the stick, for dollars. Upon the opposite side notches for days worked, and lines across the surface for weeks. In this manner credit could be given on the "money side," and there was always exactness between these stick records and those kept in proper form by the superiors.

Other records were also examined by the writer, in which

the authors had recourse to paper; at the top of the sheet was a representation of the brand used, and beneath the regular number of short and long lines, denoting the decimal system of recording. Sometimes small rings were inserted at every tenth point, instead of the longer vertical stroke.

When a rancheria possessed cattle only, there was no necessity for notching the end of the stick to denote "cattle," as there was no cause for error. Consequently the sticks were cut off transversely, without any specific pointing or notching. The same was adopted, also, where horses were owned, exclusively.

Tattooing was practised and nearly all of the older members of the tribe still bear faint lines upon the chin; this is noticeable to a greater extent among the women than the men. At present, personal ornamentation is done in colors only, applied in the form of vertical lines upon the chin, transverse bars upon the cheeks, or both. The tattoo design worn by a land-owner, formerly served as a property mark by being cut or painted, upon trees or posts selected to indicate the boundaries. These marks were almost equivalent to the owner's name, and were known to the remainder of the tribe. In this respect of engraving tattoo marks upon the bark of trees, there is great resemblance to a custom practised by the natives of New Zealand, where the facial decorations of a dead man are reproduced upon trees near his grave; this is equal to an autograph and can be readily interpreted by a native.

Knotted cords were used by some of these Indians, in business transactions, a custom adopted after their northern neighbors, the Paloñes,—a sub-tribe of the Chemehuevi,—so called by the Spanish settlers, on account of wearing the hair cut so short as to suggest the idea of "baldheadedness." The method of using knotted cords was in the following manner: Each year the Paloni selected a certain number of their tribe to visit the settlement to sell native blankets, and every one who sent goods provided the salesman with two cords, twisted out of the hair of some animal, on one of which a knot was tied for every *real* received, and on the other, the number of blankets sold. When the amount reached one dollar, a double knot was made. Upon the return of the agent, each person would select his own cords, count up the number of blankets sold and the amount received for the goods, for which the seller was responsible.

3. The combination of the letters *q* and *h* is intended to represent the sound of the Spanish *j* in *mujer; ach*, German, etc., now expressed by the character *χ*. In the MS., Mr. Ried wrote the letter *q* over the *h*.
4. During the time of the writer's recent investigations among the few Indians remaining in the vicinity of Santa Barbara, he learned the tribal designations of that people, which they gave as Sfoqtun'. The band occupying the region about the Cathedral Oaks, was known as the Smúwitsh. That located nearer the coast, at the Partera, the Saq'pili'. All town villages, *i. e.*, at Santa Barbara, were called Mikíquë. The Indians formerly living in Santa Cruz Island (now extinct) termed themselves Tshúma. (In the preceding words, the *q* has the sound of *ch*, in German *nicht*).
5. The word, at the present time, is *iu'at*.
6. Three forms of war-clubs are given in Figures 2, 3 and 4. They are all made of extremely hard, heavy wood, and in some examples there is evidence of an attempt at ornamentation, done in lines burnt upon the surface, no doubt with a metallic substance. The club represented in Fig. 2, measures thirty-four inches in length, one and a quarter inches in diameter near the handle, and two and a half inches at the opposite end; Fig. 3 measures eighteen inches in length, the handle two and a half inches in diameter, while the four-sided head, four inches each way, is armed with sharp conical points of wood projecting nearly an inch above the surface. These projections are of hard wood, and are secured by a socket, into which the pieces were driven previous to pointing.

   Fig. 4 is of the same length as the preceding; it has three sides, each face measuring four inches in width, with just sufficient handle to afford a good grasp.

   The object represented in Fig. 5 was used as an accompaniment to the rattle, in dances. Two pieces of hard wood twenty inches long, each two inches broad and a little more than half an inch thick, are secured at the handle with thongs and vegetable gum, allowing the ends of the wooden blades to be about an inch apart. This is shaken, and makes a noise resembling clapping of hands. Fig. 6 is a rattle, made by passing a wooden handle through two boards, each three and three-fourths by four inches in width, over which rawhide is stretched to form a hollow case. Inside of this are seeds, and small stones. The top is ornamented with feathers.
7. Rabbits were killed with the *Mákóna*, or boomerang, the form of

which is given in Fig. 7. The original measures two feet in length in a straight line, one and one-fourth inches across at the handle and one and three-fourths inches at the broadest part. The average thickness is about three-fourths of an inch. The weapon is made of hard wood (apparently dog-wood, or mesquite), and ornamented with various markings which are burnt upon the surface. The end opposite the handle is finished so as to imitate the head of what appears to be a snake.

When viewing the weapon edgewise, it will be observed that considerable curve exists, but it is not known that these Indians were ever acquainted with the art of throwing the Makána so as to produce the strange and erratic motions pursued by a boomerang at the hands of a native Australian.

The weapon was thrown near the ground, so as not to pass over a rabbit while it was running. Its general form seems similar to the Zuñi Klĕani, and a similar weapon used by the Moqui, a notice of which was first published by the writer in the Trans. Anthrop. Inst. of Great Britain and Ireland, Vol. IX, p. 464.

8. The black beads referred to are made of dark, greenish black serpentine, some specimens resembling diorite, excepting as to hardness. They vary in size; the smallest one measuring about one-fourth of an inch in diameter and one-eighth in thickness, and the largest, known to the writer, measures seven-eighths of an inch in diameter by one and a half inches in length. The perforation in this specimen is one-fourth of an inch in diameter, and presents transverse striæ caused by the sand used in drilling.

The shell beads were usually made of *Haliotis* and *Tivola*. Shell money-beads were flat, and about one-third of an inch in diameter. Other beads used for necklaces were cylindrical or sub-cylindrical, larger in the middle than toward either end. Many of them, found in graves, present the same style of delicate perforations as we find in the beads from Santa Cruz Island. The writer is of the opinion that these narrow perforations were made by means of sea lions' whiskers as drills, and extremely fine silicious dust. The channels are scarcely large enough to admit a good sized thread, and in several beads which have split lengthwise it is apparent that drilling was done from both ends, as the perforations cease a short distance beyond the middle of the bead, thus passing one another, perhaps less than the tenth of an inch. It is evident, from the appearance of other unfinished specimens,

that the boring was begun by using a stone drill — of which many and various forms occur — after which the bristle was applied. The channels are slightly conical toward the outer end, and at about one-fourth the length of the shell there is a constriction beyond which and near the middle of the bead, the channel again becomes wider, assuming an elliptical form. No doubt the rapid rotary motion of a flexible drill would cause sufficient divergence to produce such an effect. In addition to this, delicate transverse striæ are also visible without the aid of a lens. A body was recently discovered on Santa Cruz Island, with which was obtained a bunch of these bristles carefully wrapped from end to end. Furthermore, it is well known that Chinamen on the Pacific coast purchase all the bristles of the sea lion that can be obtained, paying twenty-five cents apiece therefor, to be prepared and sold as tooth-picks.

Most of the shells required for use were obtained at the Santa Catalina Islands. These, as well as the islands opposite Santa Barbara, are fine localities for Haliotis shells even at this time. The Serpentine, used in making beads, ollas and large rings, was also obtained at the islands first named.

9. Between Los Angeles and the coast, near San Pedro, gravestones were erected to the memory of the deceased, or, perhaps simply to identify the location of the body, so that his friends might come to offer food, and to mourn. Fig. 8 represents the etchings upon a piece of sandstone slab obtained from the above mentioned locality. On account of the fracture of the specimen, and the loss of, perhaps, important parts, only a few characters are visible, but these, resembling whales, were evidently carved there to show that the deceased had been a fisherman or whale hunter. Such a custom prevails very extensively among the Kiatéźamut Innuit of southern Alaska. There, the profession of a man, and even a woman, is carefully recorded upon wooden slabs.

10. The term Shaman is more appropriate in this connection. The Seer was an individual whose profession was distinct from that of the Shaman. With some tribes there are Rain-makers, etc. During the performance of religious or professional ceremonies, the Shaman resorts to many and various utterances and movements not understood by the uninitiated. Rattles, small dried animals or skins, curiously shaped vegetable growths, rare sparkling minerals and wrought stones of odd forms, are employed as fetishes. Among the last named the writer found both oblong and pyriform polished

stones, such as have hitherto been considered, and described, as "plummets, plumb-bobs, sinkers, and weights." An old Tobikhar said that such stones would require too much time and labor to be used only to cast into the sea. The Indians term them "medicine stones," and consider them as possessing medicinal properties.

That the Shaman also prepared arrow-poison, there is no doubt. Nearly all of the tribes between the Pacific ocean and the Rocky mountains had more or less knowledge of plants, insects, or other materials, which rendered it capable of producing septicæmia in any person or animal wounded thereby. For more extended information by the present writer, respecting the methods of preparation, and the tribes by whom used, see *Bull. Société d'Anthropologie de Paris*, Vol. VI, 3rd Series, 1883, p. 205, *et seq.*; *Verhandl. Berliner. Gesell. für Anthrop. Ethnol. und Urgesch.*, 1880, p. 91, *et seq.*

11. Although the author says that siphylis was unknown, there is every reason to suppose that this disease made its appearance among the coast and island Indians at a very early day. A skull, which the writer obtained at Santa Cruz Island — and has in his possession still,— shows great destruction over the left parietal bone, beginning at the temporal bone and extending backward and upward, so as to embrace the surface of nearly the lower half of the temporal, while on the frontal bone the erosion extended to greater depth, taking in part of the external portion of the supra orbital ridge, thence upward for about one inch and across the forehead to a point above the middle of the right orbit. In the middle of these eroded areas are the more recent deposits of bony matter, forming, what may have been a healthy reconstruction of the parts. The skull is an extremely interesting one, and the only specimen of this kind known to the writer to have been obtained at that locality. From the general style of burial, and the primitive forms of the relics obtained from the grave, there is every reason to believe that the body was not of recent years.

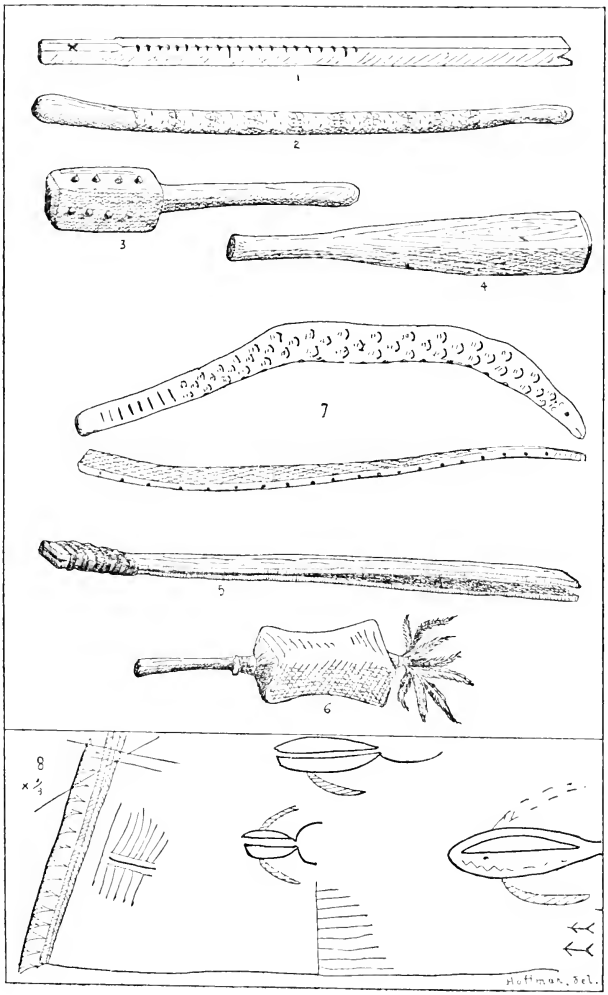
12. This game was played by many tribes of Indians, and was called "Chunkee" by Adair, who observed it among the Muskoki. The writer saw it played by the Coyotero Apaches, in 1871, at Camp Apache, A. T., and an extended notice of the subject was printed in the *American Naturalist*, 1878, Vol. XII, pp. 478–481.

The Indians at Santa Barbara also played a similar game, using a barrel-shaped stone ring, three inches in diameter

and four in length, at which the players shot arrows, the idea being to penetrate the hole while the ring was in motion. The players stood upon either side of the course.

13. Probably the country of the Mojaves, the tribal name of which is Amoẓawi or Amoẓami. The western range of their territory formerly extended along the northern slope of the San Fernando range, but how far westward is not known.

14. Tuñas, generally known as prickly pears, are the edible fruit of several varieties of Opuntia, or broad-leaved cactus. These were sometimes crushed and mixed with the meal of seeds or acorns. Many of the mortars found in southern California, are merely circular, flat stones, having a slight depression on one side upon which the pounding was done. To prevent the scattering of seed, a funnel-shaped basket was constructed, similar to those used for carrying fruit, etc.; the lower apex was cut off allowing the hole to be nearly as large as the stone mortar. The cut edge of the basket was then temporarily secured to the mortar by applying a thick coating of bitumen. The basket thus served as a hopper. When the surface of a mortar became smooth by use, it was again roughened by pecking it with a sharp piece of quartz or chalcedony, both of which are abundant.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OPENING OF HATTERAS INLET.

COMMUNICATED BY WILLIAM L. WELCH.

Hatteras Inlet is on the coast of North Carolina, between Cape Hatteras and Ocracoke Inlet, about twelve miles from the Cape, southwest; and fourteen miles northeast of Ocracoke.

It is mentioned in Blunt's Coast Pilot, but not in the Gazetteers, or Encyclopædias: it is surprising that no account of this Inlet and harbor so remarkable in itself, and of so much interest in the late war, by reason of the Burnside Expedition passing through it, can be found in any of these books of reference.

The writer was stationed at Hatteras Inlet in the summer of 1864, for about a month, and was then told by one of the native pilots (Reuben Quidley) that the place where the inlet is, and the water three or four fathoms deep, used to be dry, solid land, and that he (Quidley) had often walked over it.

When in Jan., 1884, the writer undertook to determine the date of the opening or cutting through of this Inlet, he consulted everything attainable, without success, and as a last resort, wrote (Jan. 12th) to the U. S. Coast Survey at Washington, D. C., for such particulars as they could and would communicate. In the answer to this (dated Jan. 21st) the information was received, that the first survey of the place in question, was made in 1850, and the results were published in the Coast Survey Reports for 1851—and further

"No mention is made of the inlet having been recently formed. I have written to the officer who made this survey and also to others who from their age and interest in the locality would be likely to know something of it, and so far as any of them know, the inlet has existed from remote times. Can your question refer to Oregon Inlet, at Bodie's Island, considerably higher up the coast? That inlet was formed by the hurricane of Sept. 8, 1846."

This answer was not satisfactory, and Jan. 25th, a communication was sent to Hon. Thos. J. Jarvis, Governor of North Carolina, asking the same questions, and giving the result of the enquiry at Washington, as set forth above.

Jan. 28th the Governor replies:

"There was a time in the present half century when there was no Hatteras Inlet. It was cut out in some great storm within that time. I cannot to-day give you the exact date, but will do so soon."

This was encouraging, but the matter lay dormant until a letter was received from Gov. Jarvis, dated April 14, as follows:

"After considerable delay, I have at last got upon the track of the information you desired as to the opening of Hatteras Inlet. It took me some time to get hold of a man who could fix the exact time. I have inquired of many and most of them like myself had a general idea of the fact that it was cut out some forty years ago."

A letter dated April 22d was next received from Gov. Jarvis, enclosing one from Col. Jno. D. Whitford of New Berne, N. C., to the Governor, and one from Redding R. Quidley, Esq., of Hatteras Inlet to Col. Whitford. Col. Whitford's letter contained an account of a chart in his possession dated 1738, made by James Wimble, on which an inlet is shown between Ocracoke Inlet and Cape Hatteras; and Mr. Quidley's letter contained an account of the cutting through of the present inlet in Sept. 1846.

Here was a starting-point, and the next step was to determine, if possible, when the old inlet closed, where it

was situated, and if it could or could not be identified with the present inlet. The writer in the meanwhile had sent a letter to the Secretary of War, asking for, and had received (through the Engineer Department), "Appendix G of the Annual Report of the Chief of Engineers for 1876, containing the Annual Report upon the Improvement of Rivers and Harbors in . . . . . North Carolina." In this, the report of S. T. Abert, U. S. Civil Eng. to Brig. Gen. A. A. Humphreys, Chief of Eng. U. S. A., has a "Table showing comparative conditions of the Inlets on the coast of North Carolina at different dates," giving with others the condition of Hatteras Inlet as shown by maps of Hariot 1585, Lawson 1708, Wimble 1738, Mouzin 1775, Atlantic Neptune 1780, Lewis 1795, and U. S. Coast Survey 1875. In each and every one of these charts or maps, Hatteras Inlet is indicated as being open, and the table shows that the Engineer that compiled it, understood, and intended to convey the impression, that the same inlet was there in 1875 that existed in 1585 and that it was at the same place on the coast.

A search by the writer among the old charts in possession of the Essex Institute, Salem, Mass., was the means of discovering a "Chart of the Coast of America from Cape Hateras to Cape Roman from the actual Surveys of Daniel Dunbibin, Esq." This chart is bound with others in "The American Pilot" published at Boston by William Norman, Book and Chart seller, an edition of 1794. This chart has no inlet between Cape Hatteras and Ocracoke, and gives 4 fathom of water on bar at Ocracoke, and 9 ft. 6 in. shoalest water on bar inside. A careful perusal of the available histories of North Carolina in the Boston Public Library was made, and in Vol. 2 of Martin's History of North Carolina, page 184, this paragraph occurs:

"1764. A chart of the sea coast having been made by Daniel Dunbibbin, was this year published by his widow, to whom the legislature allowed a small premium."

This last information seems to indicate that the charts of Mouzin 1775, Atlantic Neptune 1780, and Lewis 1795 (mentioned before) are, as regards an inlet between Cape Hatteras and Ocracoke Inlet entirely wrong, and are simply copies of Wimble's or some other older chart. The letter of Mr. Quidley, received in April through Col. Whitford and Gov. Jarvis, was dated at Hatteras Inlet, N. C., Apr. 7, 1884, and says:

"I will say in regard to your request, that Hatteras Inlet was cut out by a heavy gale, a violent storm on the 7th of Sept., at night, 1846. The first vessel that passed through into Pamlico Sound, was schooner Asher C. Havens, on the 5th day of Feb'y, 1847, Capt. David Barrett, Commander: I was pilot of said schooner, conducted her through all safe. No other vessel had ever passed through the Inlet.

The first vessel that ever crossed over the bar of Hatteras Inlet was in Jan., '47. I was then a licensed pilot for Ocracoke Inlet, got on board to pilot the schooner into Ocracoke, wind came ahead, I went into Hatteras Inlet for harbor, stayed all night, went out next morning and went into Ocracoke. I cannot give any correct report what time the first vessel passed out, it was not long after the first passed through: the second vessel passed through about two weeks after the first, it was a small steamer bound through Core Sound, I piloted it through."

In another letter to the writer of this, Mr. Quidley says:

"I was licensed to pilot at Ocracoke Inlet in 1831: I then lived at Hatteras and when I piloted a vessel in at Ocracoke, which very often would be two, three, or four a week, and walked home to Hatteras, there was nothing to cause me or any one, to have any idea that there would be an inlet there, sooner than any other part of the beach; there was no water passed over the place except in those heavy easterly gales, when as a general thing it passes over nearly all our beach from Hatteras to Ocracoke. The day the inlet was cut out, there were several families living where the inlet is now, they had no more thought of seeing an inlet there, than of any part of the beach, but to their great surprise, in the morning they saw the sea and sound

connected together, and the live oaks washing up by the roots and tumbling into the ocean. I was well acquainted with the growth of the land where the inlet now is. I lived with my brother where the inlet is now. I have worked with him cutting wood and chopping yopon, where now, I have no doubt there is three or four fathoms of water; the growth was live oak principally, did not grow tall, but large trunks and spreading limbs. I had an old uncle lived about where the inlet is, who had a fine fig orchard, and many peach trees on his lot, with fine potato patch and garden."

Again he writes:

"Since I wrote you last, I have conversed with the two oldest men living on this portion of the Banks (one is in his 75th year, the other in his 72d), both born and raised where the inlet is now.

John Austin, the eldest, says he remembers his grandfather very well; he says he has heard the old gentleman say, there was an inlet about six miles southwest of where the inlet is now; he states that the old man said there was an English vessel, a ship, ran on the bar of said inlet, and was lost, and the wreck sanded up and the beach made down to it and finally closed up the inlet; Mr. Austin's grandfather's name was Styron; died Mch. 7, 1825, aged 86 yrs.

The other man I talked with was William Ballance. He says his father died in 1826, 68 years old; he says he heard his father say that he had seen a piece of wreck standing up, right at, or near the place that Austin speaks of as being the place where the inlet was, and had been told by older people, that it was the stern post of the vessel that closed up the inlet. This place that they speak of is about five or six miles from this inlet we have now, between two points known now as 'Shingle Creek' and 'Quake Hammock.'"

In a letter from Mr. Quidley dated Sept. 29, 1884, he says:

"The Shingle Creek is about 5 miles from Hatteras Inlet, is 40 or 50 yds. wide, makes up through a portion of marsh and a low growth of woods or bushes to the beach, but not through the beach; and a little to northeast of it there is another creek, about like the one just named, called the "Old Inlet Creek," which I think might take its name from being somewhere near where the inlet was. The "Great Swash" is a level place of beach, nothing growing on it but some grass or sedge next to the sound side, and extends about a mile to next growth of woods called "Knole"; the Quake Hammock is a small clump of woods lying between Shingle Creek and Great Swash.

I cannot give the exact time that vessels left off passing through

Ocracoke. I was one of the first Commissioners of Navigation appointed for Hatteras Inlet, I think in 1852; there has been but very little passing through Ocracoke Inlet since 1855; there is no vessel passes through there now except perchance, that a vessel goes in case of distress of weather, or head winds, and draws light draught of water, 4 or 5 feet."

To sum up: we find on the old charts of the coast of North Carolina from those of 1585, to that of James Wimble 1738, an inlet indicated between Ocracoke Inlet and Cape Hatteras and about eight miles northeast of the former, known as Hatteras Inlet, which from the evidence given must have closed near the middle of the last century; for the chart of Daniel Dunbibbin was published by his widow, in 1764, and this was made from actual surveys, and it has no inlet between Ocracoke Inlet and Cape Hatteras; and we must conclude that all charts of that coast quoted in the paper above, made later than Dunbibbin's, are faulty in the matter of this inlet, and are simply copies of some previous chart. We also conclude that the claim of the U. S. Coast Survey authorities that the present inlet at Hatteras has "existed from remote times," and that of Mr. Abert, that this present inlet is identical with that of 1585 is erroneous; for the evidence given cannot be controverted that the present Hatteras Inlet was opened by the great gale of Sept., 1846, which was so severe on our southern coast.

This paper and its conclusions are respectfully referred to the U. S. authorities and the publishers of Gazetteers and Encyclopædias for their adoption.

THROUGH WHICH INLET DID THE ENGLISH ADVENTURERS OF 1584 ENTER THE SOUNDS OF NORTH CAROLINA.

ALSO

SOME CHANGES IN THE COAST LINE SINCE THEIR TIME.

COMMUNICATED BY WILLIAM L. WELCH.

THE following extracts are from the report of the voyage under Amadas and Barlowe (written by Barlowe) made in 1584. After mentioning their arrival upon the coast, they say;

"We sailed along the same a hundred and twenty English miles before we could find any entrance or river issuing into the sea. The first that appeared unto us we entered, though not without some difficulty, and cast anchor about three harquebus-shot within the haven's mouth, on the left hand of the same."

"This land lay stretching itself to the west, which after we found to be but an island of twenty miles long, and not over six miles broad."

They speak of visits of the Indians, and then say

"After they had been divers times aboard the ships, myself with seven more went twenty miles into the river that runs towards the city of Skicoak, which river they call Occam; and the evening following, we came to an island, which they call Roanoak, distant from the harbor by which we entered, seven leagues; and at the north end thereof was a village of nine houses." "Beyond this island there is the main land, and over against this Island, falls into this spacious water, the great river called Occam by the inhabitants, on which stands a town called Pomeiock, and six days journey from the same is situate their greatest city called Skicoak." "Into this river falls another great river, called Cipo, in which there is found great stores of muscles, in which there are pearls; likewise there descendeth into this Occam, another river called Nomopam, on the one side whereof stands a great town called Chawanook." "Towards the southwest, four days journey, is situated a town called Sequotan, which is the southernmost

town of Wingandacoa, near into which, six and twenty years past, there was a ship cast away, whereof some of the people were saved, and those were white people, whom the country people preserved. And after ten days remaining in an out island uninhabited, called Wocokon, they with help of some of the dwellers of Sequotan, fastened two boats of the country together, and made masts unto them, and sails of their shirts, and having taken into them such victuals as the country yielded, they departed, after they had remained in this out island three weeks."

This report was accompanied by a sketch of the coast and adjacent country, as they found it, extending from perhaps forty miles north of Roanoke to ten miles south of it; it has five inlets drawn on it, the southern one is north of the southern end of Roanoke Island, the next perhaps five miles north of that; the first one north of Roanoke Island, and also north of an island apparently "Collington's", is marked "Trinity Harbor", and there are two north of this, the most northern one, might be "Old Currituck Inlet"; off these most northern inlets, are anchored the two ships of the adventurers, and inside apparently sailing from "Trinity Harbor" to "Roanoke Island" is a boat with one square sail, full of men; from these, this sketch and the text of their report, the writer concludes that *they entered at "Trinity Harbor," north of Roanoke Island, which inlet was about where "Caffey" inlet used to be;* that their river Occam was our Albemarle Sound; that their river Nomopam was our Chowan; and that Wocokon, our Ocracoke, was to them an unknown place; that is, they did not visit it, for if they had, it would be reasonable to suppose their sketch of the coast would have included it. Bancroft in his History of United States says they entered at Wocokon (our Ocracoke) but it is simply an assertion, and can not be proved. Hawks' History of North Carolina gives New Inlet, south of Roanoke Island, as the place of entrance; and that the Occam was a part of the

sound between a line of islands parallel to the coast, one of which was Roanoke; but, as New Inlet was not open at that time, and the river Nomopam, on which stood "Chawanook" does not fall into Roanoke Sound, this theory fails. Mr. Abert, U. S. Civil Eng. follows Bancroft, and to provide a river Occam, he connects Alligator River with long Shoal River making one long river of them, but the same objection affects his river as that of Hawks'; he also fails to convince himself that Roanoke Island is seven leagues only from Ocracoke Inlet; most probably his mistake arises from confounding Pomeiock, a town on Albemarle Sound (at or near Edenton) with Pomouik, near Secotan, on or near Mattamuskeet Lake; other authors place the entrance of Amadas and Barlowe at either Ocracoke or Hatteras Inlet. John W. Moore, in his history of North Carolina, published in 1880, places the entrance at Trinity Harbor *"nearly opposite Roanoke Island"*; this last is the nearest of any to what the writer considers the facts, but as the inlet entered was seven leagues from Roanoke Island, *Caffey Inlet was in all probability the place of entrance.*

SOME CHANGES IN THE COAST LINE SINCE 1584.

Mr. Abert, U. S. Civil Eng., in the Table of Condition of Inlets, in his report to War Dept. in 1876, says the inlet known as Hatorask in 1590, New in 1738, Gunt in 1775, Gant in 1795, is the same as that known on U. S. C. Survey chart of 1875 as Oregon: in this he is evidently mistaken, if we may rely on the evidence of the U. S. C. Survey office, that Oregon Inlet was opened in 1846. In the same table, the Hatteras Inlet of to-day is given as being identical with that of 1585; but the evidence of R. R. Quidley and other residents of Hatteras, must be taken as conclusive, that the present Hatteras Inlet was also opened in 1846. He also says:

"The same inlets now exist between the outlying islands, and the same shoals are now found off the coast, as were found by the navigators of 1584. The beach, banks, barrier reefs, or whatever they may be called, appear to have been much wider than at the present time. This seems to have been notably the case near Cape Hatteras. The preservation of the status of the bars at the inlets for so many years indicates a permanence in the relation of the forces by which they are maintained."

Of the inlets on the coast of North Carolina from near Cape Henry to Ocracoke Inlet, that were open in 1585–90, not one, except Ocracoke, is open to-day, and Ocracoke is of little use to navigation: there was no inlet between those near, and north of Roanoke Island, and one which appears on the maps as being at Cape Hatteras. The date of closing of the inlet at Cape Hatteras it is impossible to give, but that there was one admits of no dispute; the old maps give it, and in the report of the last voyage made by John White in 1590, appears this:

"On the twelfth, in the morning we departed from thence, and toward night we came to an anchor at the northeast end of the island of Croatoan, by reason of a breach which we perceived to lie out two or three leagues into the sea; here we rode all that night." "This breach is in thirty-five degrees and a half, and lays at the very northeast point of Croatoan, where goes a fret out of the main sea into the inner waters which part the islands and the main land."

As was the course in those days, White had made the West Indies first, then the coast of Florida, and was coasting along towards Roanoke Island, and the day before the event chronicled above had anchored off Cape Lookout, or near Beaufort. Croatoan was that part of the coast lying northeast and southwest, between old Hatteras Inlet and the inlet at Cape Hatteras.

The latitude given in the extract above would place the breach and fret rather north of the present Cape Hatteras, but an error of 15′ to 25′ in those days, would not be too much to suppose.

The trend of the coast to-day from Cape Henry to within twenty-five miles of Cape Hatteras is southeast; for the next twenty-five miles it is nearly due south, except that, from a few miles north of the Cape it is a little to the west of south. The old maps of 1585–90 give, just south of Roanoke Island, a coast line running nearly east, and so far, that the extreme point was far east of Cape Hatteras, then taking a southwest direction to within a few miles of Cape Hatteras; it must have been on this point that White, in his last voyage, just escaped being wrecked, and here also were hills, designated as "Kenrick's Mount": some heavy storm, or series of storms, or some great convulsion of nature has entirely carried this away, and perhaps opened Loggerhead and New Inlets. Platt and Wimble shoals are, perhaps, all there is left of this large extent of land.

The charts of Wimble and Dunbibbin, both give Cape Hatteras as jutting out into the ocean like a sharp elbow, while to-day, the cape as shown by the U. S. Coast Survey charts is rounded in and the point all carried away.

These changes, noted above, are well worthy the attention of the U. S Coast Survey and Engineer Department, U. S. A.

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ON THE CARAPAX AND STERNUM OF DECAPOD CRUSTACEA.*

BY HOWARD AYERS, Ph.D., Ann Arbor, Mich.

The determination of the homology of the carapax and sternum among the Crustacea is rendered difficult by the endless variety of forms assumed by their constituent parts, and the consequent perplexing differences in the relation of these parts to each other. Before stating the conclusions and arguments in favor of the solution at which I have arrived after a study of several forms chiefly of the Decapod type, it may conduce to clearness to give in a few words, the main facts and conclusions of the previous writers on this subject.

Although Huxley (1) is the latest writer who expresses views on the homologies of the Crustacean carapax, he offers no new explanation but adheres to the old conception of a fusion of the terga of the fourteen anterior somites into a carapax. He writes (in describing *Astacus fluviatilis*) "The carapace, therefore, corresponds in position with the terga and tergal halves of the pleura of all the somites which are thus reflected into it, and these somites

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* This paper was prepared at the Mus. Comp. Zoöl., under the direction of Prof. W. Faxon, in the college year 1882–83.

include all, without exception, from the last thoracic to the ophthalmic. * * *" At the sides of the antennulary and antennary somites the rostral prolongation of the carapace is the direct continuation outward of the epimera of these somites, and there is nothing to be compared to an apodeme, but the sternum of the ophthalmic somite after giving off the lamella which forms the inferomedian rostrum, is prolonged on each side of the middle line backwards and outwards into a free, expanded, thin, calcified process which applies itself against the carapace by its upper surface, and by its under surface gives attachment to the anterior gastric muscles. * * * On the dorsal surface there is no indication of any division of the carapace into terga corresponding with the sterna of the somites, but it is marked by a well-defined curved groove. * * *" The accompanying diagram explains his views of the somite in *Astacus*.

Milne-Edwards(2) considers the carapax in the majority of the Decapods to consist of a single piece, part of

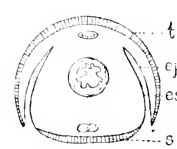

Diagram of crustacean segment; *ep*, epimerum; *es*, episternum; *s*, sternum; *t*, tergum.

which is furnished by the antennary and mandibulary somites respectively. This author states, that while in Squilla the carapax belongs almost entirely to the antennary segment, in Limnetis on the other hand, it pertains chiefly to the mandibulary somite. Furthermore, the tergum of the antennulary segment is entirely wanting in the Deca-

pods. He continues (*loc. cit.*, p. 233), "J'ai fait voir, dans un autre écrit que le carapace, lors même qu'elle recouvre la totalité du thorax aussi bien que toute la portion céphalique du corps doit être considérée comme une portion de la tête dont une portion du squelette s'est développée d'une manière excessif, et a chevauché en avant et en arrière sur les parties voisines ; j'ai établi aussi qu'elle appartenait au système des pièces tergales, et qui celles-ci n'étaient fournies ni par les anneaux ophthalmique ou antennulaire, ni par les zoonites céphaliques postérieures. Il me paraissoit probable qu'elle dépendait de l'anneau antennaire ou de l'anneau mandibulaire, c'est-à-dire du troisième ou du quatrième anneau de la tête, mais qu'elle ne procédait que d'un seul ces zoonites. Les faits dont il vient d'être question permettent de rectifier une partie de ces conclusions, et d'arriver à une approximation plus grande de la vérité. Effectivement l'arceau céphalique de la carapace des Décapodes me semble ne pouvoir être qu'une dépendence de l'anneau antennaire, tant à raison connexions avec les autres pièces du squelette tégumentaire, qu'en conséquence de l'origine des nerfs dont ses parties molles sont pourvues, puisque ces nerfs proviennent des ganglions cérébroides ou sous-œsophagiens, tandis que les nerfs appartenant au appendices du zoonite suivant, ou anneau mandibulaire, naissent des ganglions post-œsophagiens. Mais l'arceau scapulaire ou postérieur de la carapace de ces Crustacés doit pour des raisons analogues, être considéré comme étant étranger au troisième zoonite céphalique, et comme appartenant à l'anneau mandibulaire. La carapace serait donc un organ plus complexe que je ne le supposait d'abord, et serait formée par deux anneaux tergaux, dépendant du troisième et du quatrième anneaux de la tête, arceaux qui fournaient d'une indépendance presque complete chez les Paguriens et les Thalassines, mais ne seraient

représentés chez les Décapodes ordinaires que par un seul segment dorsal dû à l'ossification diffuse ou fusion des éléments sclerodermique de toute la portion du squelette tégumentaire correspondant à ces deux arceaux. Mais chez les Crustacés inférieures, la carapace ne paraît avoir d'ordinaire une composition plus simple, et être formée tantôt par les analogues de l'arceau céphalique seulement, tantôt par les représentants de l'arceau scapulaire. Ainsi, chez les Squilles, la portion céphalique de la carapace est très-développée ; mais toute la portion postérieure au scapulaire paraît manquer complétement, et chez les Limnadies, au contraire, l'espèce de coquille bivalve, qui tient lieu d'une carapace ordinaire, me paraît être due au développement excessif de la portion scapulaire seulement, et dépendre de l'anneau mandibulaire, ont peut-être même de l'un des zoonites suivant." Owen (3) reflects Milne-Edwards' views throughout as quoted above. Dana (4) differs from Milne-Edwards in that he considers the lateral (ventral) plates of the carapax of crabs to be true *terga* instead of epimera (*loc. cit.*, p. 27). He infers "that the epistome (or its anterior part) belongs to the second, or to the second and first normal segments, that is, to the antennulary or to the antennulary and ophthalmic segments. For convenience of reference I have compiled the following table from the author's statements of his views regarding the number of segments and what parts of each enter into the composition of the crab carapax.

1. Ophthalmic somite. Parts entirely wanting; appendages, however, *present*.

2. Antennulary somite. Sternum present (probably fused with the ophthalmic sternum into one piece); the other parts wanting; appendages present.

3. Antennary somite. The parts (sternum, tergum, episternal plate) present.

4. Mandibulary somite. The sternum, episternal plates, epimeral plates and tergum present

After stating in a very clear manner the facts he had established, the author draws the following conclusions. The carapax of the Brachyura includes:

I. The first and second normal segments represented by the epistome, or its anterior position, and the inter-antennary septum.

II. The third normal segment, represented by the main body of the carapax, and the anterior portion of the prelabial plate or palate.

III. The fourth normal or mandibular segment represented by the posterior and outer part of the prelabial plate and the ventral pieces of the carapax.

Concerning the carapax of the Macroura the author again differs from Milne-Edwards in designating the lateral and posterior plates of the carapax of *Astacus* *mandibular terga* instead of epimera. After a careful comparative description of numerous forms both among the Macroura and the lower Crustacea (*loc. cit.*, pp. 32–37) in which he mentions several seemingly adverse cases, the author concludes that the origin of the carapax and the disposition of its parts are essentially the same throughout the class.

From the foregoing extracts it will be seen that Dana's views are in advance of those of the other investigators, but there yet remain several points of interest on which it is desirable to collect further evidence. Both Milne-Edwards and Dana have established with a high degree of probability the origin of the carapax from the terga of the mandibulary and antennary somites, but neither of them succeeded in finding a conclusive demonstration of the fact. In the very young *Squilla* the thoracic and abdominal segments of the body may, by careful dissection, be removed from their connection with the carapax, without disturbing the relation of the parts in intimate connex with the latter. In such a preparation the point of attachment will be seen to lie immediately behind the *mandibulary sternum*, fig. 15, z. Since both the *ophthalmic* and the *antennulary* segments are *entire and have no connection*

with the carapax it follows that the carapax in the young *Squilla* pertains to the antennary and mandibulary somite —to these and these only. The same is true of the zoea of *Porcellana*. The relations of the carapax in the young stages of *Cancer* and *Carcinus* could not be made out accurately, owing to the poor state of preservation of the specimens at my disposal. Among the Brachyura the tergum of the ophthalmic somite is *present as a distinct plate beneath the carapax* and may be exposed by cutting away the rostral region of the carapax, or it may sometimes be seen from behind (*e. g.*, *Platyonychus*, *Actæodes*, *Scylla*). The antennulary tergum, on the other hand, seems to have disappeared entirely.

The sternum of the ophthalmic somite, considered by Dana to be wanting among the Brachyura, is present, as it appears to me, in what has hitherto been considered as a portion of the antennary somite and designated the antennary septum (compare Huxley, *loc. cit.*, p. 296, fig. 76, *c.*). In *Actæodes*, figs. 4, 6 and 7, the sternum of this somite is a distinct cuneiform body, wedged in between the rostrum and the antennary sternum, but separated from both by sutures.

Its connection is more intimate with the antennary sternum than with the rostrum. The basal joints of the antennæ lie in contact with it, since it helps to form the inner angle of both antennary orbits. This wedge-shaped body extends backward *into* the facial region and furnishes the calcareous sockets for the bases of the eyestalks; but has *nothing to do* with the orbital region. This latter has arisen by the overgrowth of the rostral region (*i. e.*, forwards) which at the same time has been forced downward into the facial area. This growth is well illustrated in the series from *Homarus*, through *Lithodes*, *Platyonychus*, *Scylla* and *Cancer*, to *Actæodes*.

In *Cancer*, fig. 3, the connection of the ophthalmic with the antennulary sternum is still closer and the former is a much thinner plate. In *Scylla*, fig. 9, the rostrum is hardly in contact with the ophthalmic sternum, although it is bent down close over it. The suture between the ophthalmic and antennary sterna is obliterated. In *Platyonychus*, fig. 1, the fusion between the two sterna is complete. In *Palinurus*, figs. 14 and 16, *Lithodes*, fig. 11, and *Homarus*, fig. 5, the rostrum has not encroached upon the ophthalmic somite and the sternum sustains its normal relations to the appendages.

Antennulary sternum. The antennulary sternum in *Actæodes* is an elongated, bar-shaped plate extending across the facial area immediately below the antennæ. The antennules abut upon its ends, while the ophthalmic sternum is fused to its upper part dividing it into halves. The figure formed by these two plates is that of a short-stemmed T inverted. This plate forms the floor of the antennary sockets. The suture between the antennulary and the antennary sterna is lenticular in form and occupied by a semicalcified membrane.

In *Cancer*, fig. 3 and *Platyonychus*, fig. 1, the parts included in the facial area are much less distinct. In *Scylla*, fig. 9, this sternal plate lies opposed to the upper margin (surface) of the antennary sternum, in the form of a thin calcareous plate. Its relations to the surrounding parts are, however, the same as in *Actæodes*. In *Lithodes*, fig. 11, the antennulary sternum resembles in all respects the ophthalmic, and consists of a smooth, scarcely calcified membrane stretched between the antennules. In *Palinurus*, figs. 14 and 16, the antennulary sternum is enormously enlarged and projects forward in the form of a truncated pyramid, equivalent to the "nasal region" of Milne-Edwards. Owing to the unusually large size

of the antennæ, the antennules have their insertion at the anterior end of this plate instead of at the sides as would normally be the case. A narrow extension of the main (fold) plate separates the basal joint of the appendages. In *Homarus* this sternum is moderately developed and occupies its normal position. There is no indication among the Macroura or the Brachyura, of the existence of any other parts of the typical somite in either of these two segments.

Antennary and mandibulary somites. As regards the sterna of the third and fourth somites in *Chlorodius* and *Scylla*, I cannot do better than refer to Dana's admirable description (*loc. cit.*, pp. 24–28). This description of *Chlorodius* will apply in every particular to *Actæodes*, figs. 4, 6 and 7. In *Cancer* and *Platyonichus* the facial region is too much fused to admit of any accurate distinction of the parts. In *Palinurus* the antennary sternum is greatly enlarged and forms the lower part of the nasal projection. At its upper termination it furnishes the basal portion of the antennulary sockets: from this point it spreads out rapidly and extends entirely across the ventral surface of the body forming the anterior, lower one-third of the boundary of each antennary socket. The openings of the green glands are near to its outer angle, on the suture separating it from the mandibulary sternum. Its connections with the anterior half or cephalic portion of the carapax are very distinct and in the form of a beaded suture. The mandibular sternum is separated from the episternal pieces by a short suture, these latter in turn are separated from the epimerals by a suture passing backward and inward toward the median ventral line. In *Lithodes*, figs. 11 and 13, and *Homarus*, figs. 5 and 17, the episternals and epimerals of both antennary and mandibulary somites are present and consequently one is able to

trace the connection of the two portions of the carapax with comparative ease. The episternals and epimerals of the antennary segment are calcified. The former appear on either side of the epistome or sternum as an oblong plate extending backward, downward and outward and also furnish the upper plate of the entrance to the gill-chamber. The epimeral plate is folded inward close upon the episternum of either side and is only to be seen when the edges of the carapax are spread apart. The episterna and epimera of the mandibular segment are represented by slightly calcified membranes more or less folded upon themselves. These plates are related to the mandibular sternum in a manner similar to that stated for that of the corresponding plates of the preceding segment. In *Squilla* the antennary sternum is especially prominent and reaches backward and downward in the form of a half cylinder, the sides of which are formed by the large episternal plates. The carapax is almost entirely made up by the antennary tergum, and the antennary somite furnishes further, fully one-half of the length of the cephalo-thoracic region of the body of this crustacean. The statement that the terga of the thoracic somites are covered by the cephalo-thoracic shield is not strictly true. The first two terga (counting from behind forwards) are entire and free, the third is united by a membrane to the posterior edge of the cephalothorax. The remaining terga are incomplete and unite with the carapax in a line curving from the point of attachment of the third, outwards and forwards on either side of the median dorsal line of the body (fig. 21).

Sternal plates, etc. Milne-Edwards considers the small calcareous plates found at the base of the thoracic appendages, which in the adult state are more or less fused with the sterna of the respective segments, to be the homologues of the episternal pieces of the typical arthropod

somite. From embryological evidence it appears very probable that these pieces originate as simple projections of the outer posterior angle of each sternal plate and that they are apparently cut off by the appearance of false sutures at a later period of development. The figures illustrating this point (figs. 18, 19, 22) hardly need any explanation beyond that given in the description of the plates. A comparison of figs. 18 and 22 is conclusive.

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EXPLANATION OF PLATES II AND III.

REFERENCE LETTERS.

a	antennule	*n*	membranous space
a'	antenna	*o*	eye or orbit
as	antennular sternum	*os*	ophthalmic sternum
a's	antennal sternum	*pg*	processes for attachment of gastric muscles
a't	antennal tergum		
a'tp	plates of antennal tergum	*r*	rostrum
ap	appendage	*s*	sternum
e	epimeral plate	*sp*	sternal piece
e'	epimeral groove	*t*	tergum
f	labrum	*tht*	thoracic tergum
g	plate covering green gland	*y*	suture between mandibular and antennal sternum
g'	plate between antennule and carapax	*x*	suture between epimeral and tergal plates of mandibular segment
m	mandibular skeleton		
mem	membrane	*z*	point of attachment of carapax to body
ms	mandibular sternum		
mt	mandibular tergum		
mp	anterior mandibular epimeral plate.		

Fig. 1. Ventral view of carapax of an immature *Platyonichus ocellatus*, caustic soda, acetic acid preparation; natural size.

Fig. 2. Ventral view of the carapax of *Etisus dentatus;* natural size.

Fig. 3. Carapax of *Cancer borealis* prepared in caustic soda, ventral view with the front slightly inclined forwards; natural size.

Figs. 4, 6 and 7. Carapax of *Actæodes* species? prepared in caustic soda and acetic acid; viewed from above, below and in front, respectively.

Fig. 5. Front view of the carapax of *Homarus americanus* with the appendages removed, fresh specimen, natural size.

Fig. 8. Ventral view of the connection of the mandibular episternum with the mandibular epimeron in *Scylla tranquebarica;* natural size.

Fig. 9. Carapax of *Scylla tranquebarica* from an alcoholic specimen; natural size.

Fig. 10. Carapax of *Chlorodius floridanus*, alcoholic specimen; enlarged.

Figs. 11 and 13. Front and ventro-lateral views of the carapax of *Lithodes maia* alcoholic specimen; natural size.

Fig. 12. Basal joints of right antenna of *Homarus americanus* showing the position of the green gland; natural size.

Figs. 14, 16 and 20. Lateral, frontal and ventral views of the carapax of *Palinurus* prepared in caustic soda; natural size.

Fig. 15. Ventral view of young *Squilla*, the thorax and abdomen of which have been removed by careful dissection; *z* shows the point of attachment of the thorax; enlarged ten diameters.

Fig. 17. Lateral view of carapax of *Homarus americanus*, caustic soda preparation; natural size.

Fig. 18. Sternum of megalops of *Cancer borealis*, showing the episternal pieces as projecting angles of the sternal plates; enlarged ten diameters.

Fig. 19. Sternum of zoea of *Cancer;* enlarged fifteen diameters.

Fig. 21. Lateral view of a sagittal section of cephalo-thoracic region of *Squilla*, caustic soda preparation; natural size.

Fig. 22 Ventral view of sternum of *Cancer borealis* (prepared in caustic soda) showing the "episternal pieces" of Milne-Edwards; natural size.

Fig. 23. Ventral view of a young *Pinnixa*; enlarged ten diameters.

Annual Meeting, Monday, May 18, 1885.

The annual meeting this evening at 7.30 o'clock. The President in the chair. Records of the last annual meeting read and approved.

The reports of the Secretary, Treasurer, Auditor, Librarian, Curators and Committees were read and duly accepted and ordered to be placed upon file.

Mr. T. F. Hunt, chairman of the committee on nominations, reported the following list of officers, which was duly elected; Messrs. Israel and Upham having been appointed to collect, assort and count the votes.

PRESIDENT:

HENRY WHEATLAND.

VICE-PRESIDENTS:

ABNER C. GOODELL, JR. — DANIEL B. HAGAR.
FREDERICK W. PUTNAM. — ROBERT S. RANTOUL.

SECRETARY: GEORGE M. WHIPPLE.

TREASURER: GEORGE D. PHIPPEN.

AUDITOR: RICHARD C. MANNING.

LIBRARIAN: WILLIAM P. UPHAM.

CURATORS:

History—HENRY F. WATERS.
Manuscripts—WILLIAM P. UPHAM.
Archæology—FREDERICK W. PUTNAM.
Numismatics—MATTHEW A. STICKNEY.
Geology—BENJAMIN F. MCDANIEL.
Botany—GEORGE D. PHIPPEN.
Zoölogy—EDWARD S. MORSE.
Horticulture—
Music—JOSHUA PHIPPEN, JR.
Painting & Sculpture—T. F. HUNT.
Technology—EDWIN C. BOLLES.

COMMITTEES:

Finance:

The PRESIDENT, *Chairman ex off.*
The TREASURER, *ex off.*
GEO. R. EMMERTON. — DAVID PINGREE.
HENRY M. BROOKS.

Library:

CHARLES W. PALFRAY. — HENRY F. KING. — WILLIAM NEILSON.
WILLIAM D. NORTHEND. — THEODORE M. OSBORNE.
The LIBRARIAN, *ex off.*

Publication:

EDWARD S. ATWOOD. — JAMES A. EMMERTON. — EDWIN C. BOLLES.
HENRY F. WATERS. — B. F. MCDANIEL. — T. F. HUNT.

Lecture:

ROBERT S. RANTOUL. — FREDERICK W. PUTNAM. — AMOS H. JOHNSON.
FILLDER ISRAEL. — A. L. HUNTINGTON.

Field Meeting:

The SECRETARY, *Chairman ex off.*

GEORGE A. PERKINS, Salem. — G. D. PHIPPEN, Salem.
GEORGE COGSWELL, Bradford. — FRANK R. KIMBALL, Salem.
FRANCIS H. APPLETON, Peabody. — EBEN N. WALTON, Salem.
NATHANIEL A. HORTON, Salem. — WINFIELD S. NEVINS, Salem.
E. S. MORSE, Salem. — JOHN H. SEARS, Salem.

THE RETROSPECT OF THE YEAR

compiled from the several reports read at the meeting and remarks of the members in relation thereto, presents the work of the Institute in the various departments since the last annual meeting.

MEMBERS.—Changes occur in the list of our associates by the addition of new names and the withdrawal of some by resignation, removal from the county or vicinity, or by death. We have received notice of the decease of nineteen, during the year, who have been enrolled on our list of members.

FRANCIS GREGORY SANBORN, son of Eastman and Mary Call Lawrence (Gregory) Sanborn, born in Andover, Mass., Jan. 18, 1838, a graduate of Phillips Academy, Andover, in 1858; he early turned his attention to outdoor studies, becoming especially proficient in entomology and conchology; he had been connected with the Massachusetts Board of Agriculture, the Bussey Institution, the Geological Survey of Kentucky, the Smithsonian Institution, and had been a Curator of the Worcester Natural History Society; died in Providence June 5, 1884. Admitted a member January 15, 1866.

JAMES B. BATCHELLER, for many years a teacher in the public schools of Salem and Marblehead, and for eighteen years a member of the School Committee in his native town. He was son of Rev. David Batcheller of Worcester, a methodist clergyman, and Elizabeth C. Bowler, of Marblehead, in which town he was born June 25, 1814; a graduate of Wesleyan University in 1845; professor of mathematics in Burlington, N. J.; died in Marblehead, July 1, 1884. Admitted a member Sept. 8, 1868.

David Brainerd Brooks, son of John and Harriet (Manning) Brooks, born in Salem, Aug. 7, 1824, died in Salem, July 9, 1884; bookseller and stationer in Salem and Boston. Admitted a member March 12, 1856. He began his business career in the bookstore of John P. Jewett, subsequently a partner, John P. Jewett & Co.

William Saunders, a well-known and distinguished veterinary surgeon for many years in Salem; his practice extending into Boston and the counties of Essex and Middlesex; son of William and Elizabeth (Britchers) Saunders, born in Helma, Devonshire, England, Nov. 27, 1817, came to Salem with his father in 1830, died in Salem, July 23, 1884. Elected to membership March 12, 1856.

Alfred Amos Abbott, son of Hon. Amos and Esther Mackey (West) Abbott, born in Andover, Mass., May 30, 1820; a graduate of Union College in 1841; lawyer in Peabody and Salem; for several years District Attorney and the clerk of the courts of Essex County from Sept. 27, 1870, to his decease. Died in Peabody, Oct. 27, 1884. Elected to membership Dec. 30, 1867.

William H. Palmer, son of Asa and Mary (Fletcher) Palmer, born in New Hampshire, March 9, 1811; trader in Salem, Mass.; died Oct. 29, 1884. Elected to membership Feb. 4, 1863.

Isaac J. Osbun, son of Franklin and Mary E. (Taylor) Osbun, born in Windsor, Richland county, Ohio, May 19, 1850; graduated at Granville College, Ohio, 1872; after keeping school one year he sailed for Europe and spent one year in the University of Tubingen and the next year at Heidelberg where he studied chemistry and physics under the famous Robert Wilhelm Bunsen. In

1875 he returned to this country; from 1876-83 was teacher in chemistry and physics in the Mass. State Normal School in Salem; he then entered upon the duties of Professor of Chemistry and Physics in Denison University, Granville, Ohio, and continued his labors there until a few weeks previous to his death which occurred Dec. 8, 1884. Elected to membership July 2, 1877.

Esther Clarke Mack, daughter of Elisha and Harriet (Clarke) Mack, born in Worthington, Mass., Sept. 25, 1821. The family returned to Salem in 1827. Died in Salem, Dec. 24, 1884. Admitted to membership Dec. 5, 1882.

Edward B. Ames, son of Burpee and Hannah (Brown) Ames, born in Salem, March 4, 1815; a well known citizen, senior member of the firm of Ames and Melcher, painters in Salem, having been in business upwards of forty years; died January 15, 1885. Admitted to membership March 29, 1854.

Nathaniel B. Perkins, son of Joseph Perkins, born in Salem, Oct. 3, 1813; for many years cashier of the Merchants National Bank, Salem; died Feb. 8, 1885. Admitted to membership Dec. 14, 1853.

Aaron Goldthwaite, son of Aaron Goldthwaite, born in Salem, March 9, 1822; of the well-known firm of Goldthwaite & Day, carpenters and contractors; died in Salem, Feb. 11, 1885. Admitted to membership Feb. 15, 1854.

Lemuel B. Hatch, the well-known coal and wood dealer, for more than forty years on Derby street; died March 1, 1885; he was the son of James and Opal (Bonney) Hatch; born in Hanson, Mass., Sept. 1, 1806. Admitted to membership March 1, 1869.

ELIZABETH B. PERKINS, daughter of Edward B. and Elizabeth P. (Barrett) Perkins, born in Salem, Jan. 1, 1850, died April 8, 1885. Admitted to membership March 21, 1881.

GEORGE LEEDS, son of Benjamin Bass and Sally (Babcock) Leeds; born in Boston, Oct. 25, 1816; fitted for college at Milton Academy, graduated at Amherst College, 1835, Andover Theological School, 1839; rector of Grace Church, Utica, N. Y.; St. Peter's, Salem; St. Peter's, Philadelphia, and Grace Church, Baltimore; D.D. Trinity College, 1861; died, in Philadelphia, of apoplexy, April 16, 1885. Admitted to membership Feb. 28, 1855.

JOHN CHAPMAN TOWNE, son of Joseph and Lydia (Chapman) Towne, born at Salem, June 16, 1834; in early life a printer in the office of the Salem Register, afterwards, for many years, teller in the Naumkeag National Bank, Salem; died April 23, 1885. Admitted to membership July 1, 1863.

LEONARD WITHINGTON, son of Joseph Weeks and Elizabeth (White) Withington, born in Dorchester, Mass., Aug. 9, 1789; a graduate of Yale College, 1814; ordained over the First Church in Newbury, Mass., Oct. 30, 1816, and continued the active pastor of that church 42 years, when he became senior Pastor; died Apr. 22, 1885. Original member.

GEORGE PICKMAN FARRINGTON, the oldest druggist in Salem, son of William and Mary (Ward) Farrington, born in Salem, Aug. 29, 1808; died April 29, 1885. Admitted to membership June 9, 1864.

CHARLES EUGENE FABENS, son of Charles Henry and Euphrasia (Fabens) Fabens, born in Cayenne, S. A., March 27, 1845; merchant in Salem and Boston, residing

in Salem, where he died Jan. 22, 1885. Admitted to membership Feb. 20, 1871.

Field Meetings have been attended with more than usual interest.

The first on Wednesday June 18, 1884, at Topsfield, in commemoration of a meeting held for the completion of the organization of the Essex County Natural History Society, fifty years ago, in that town: its location in the geographical centre of the county, before the introduction of railroads, was considered a very suitable and convenient place for the holding of conventions and other gatherings, possessing a general county interest. The morning was passed at the residence of Mr. Thomas W. Peirce, whose extensive grounds, fine gardens and conservatories were opened to the visitors. The afternoon session in the Town Hall was largely attended; the speakers were the President and Messrs. E. S. Morse, John Robinson, B. F. McDaniel, S. P. Fowler and J. J. H. Gregory. The progress made in Zoölogy, Botany, Geology and the kindred branches of science since 1834, especially with reference to the increasing attention devoted to these studies, in this county was fully discussed. Mr. Fowler, who was present at the meeting fifty years since, gave an account of the gathering and spoke of those who were present, all of whom, with a few exceptions, have passed away.

Second Meeting at Annisquam, Gloucester, Wednesday, July 16, 1884. The morning was spent at the seaside Laboratory of Prof. Alpheus Hyatt in observing the work of the students, also in visiting the beaches and other objects of interest. At the afternoon session remarks were offered by the president, Messrs. Kingsley and Hyatt of the Laboratory giving a full account of the methods of instruction. Mr. James S. Jewett, Hon. Jonas H. French

and Hon. James Davis, mentioned interesting incidents in the History of Annisquam. Mr. A. C. Perkins of Brooklyn, N. Y., and N. A. Horton of Salem, also addressed the meeting.

Third, at Asbury Grove, Hamilton, Thursday, July 31, 1884, postponed from the preceding day on account of the weather. In the forenoon a botanical excursion was made to Pleasant Pond under the direction of Mr. Sears. At the meeting in the afternoon, the president and Messrs J. F. Almy, John H. Sears, George D. Phippen, F. W. Putnam, B. F. McDaniel and N. A. Horton were the speakers.

Fourth, at old Newbury on Thursday, August 28, 1884. In the morning the party went to Plum Island and on the return visited the ethnological collections of Mr. Alfred Osgood, also several of the old houses in Newbury and Newburyport. The afternoon session was held in the vestry of the First Church. The President after a few introductory remarks called upon Capt. Luther Dame who read a paper on the life and times of Sir William Pepperell, exhibiting several original manuscripts and old family relics; Alfred Osgood spoke on ethnology; Stephen H. Phillips took for his subject, the early settlers of Newbury; Rev. B. F. McDaniel spoke on the mineralogy of Newbury; Rev. Messrs. F. Israel of Salem, and George Osgood of Kensington, N. H., alluded to the Rev. Dr. Withington, for nearly seventy years, the worthy and beloved pastor of this church and this people; Mr. D. B. Hagar made some closing remarks and offered a vote of thanks for favors received.

Two Geological Excursions, a sequel to the Field Meetings, have taken place under the direction of Rev. B. F. McDaniel, the curator of this department.

First, on Monday, Oct. 13, 1884, to the famous locality

in Newbury oldtown popularly known as "the Devil's Den." For over forty years it has been visited by mineralogists for the fine specimens that have made it famous all over the country, and still the supply is abundant. Other openings have been made near by, the most noted of which is the "Basin."

Specimens of the following minerals, some of them very fine, were brought home. Noble serpentine, common serpentine, retinalite, wollastonite, chrysolite, massive garnet, nemalite, calcite, chalybite and dolomite. The noble serpentine and wollastonite are easily obtained, and are very fine at the "Den," while at the "Basin," the common serpentine and retinalite abound.

Second, on Monday, Nov. 10, 1884, to the Quarry near Lynnfield Centre. A stop was made at Ship Rock in Peabody, after which the drive was continued to Lynnfield. The Quarry was reached at half-past eleven o'clock. Hammers and drills were soon in use and good specimens of brucite and serpentine were found in abundance. An increased interest in the study of geology has been awakened, and the result will probably be an interesting addition to the already large collection of Essex County Minerals in the Museum.

MEETINGS. Regular meetings occur on the first and third Monday evenings of each month. At these the following communications were read and lectures delivered:

From *E. A. Silsbee*, talk upon "Criticism of Poetry."

Stephen H. Phillips, "Witchcraft not exceptional in Salem."

Charles A. Benjamin, "On an adjacent Peninsula."

A. C. Hobbs of Bridgeport, Conn., lecture "On the History of Locks."

William G. Barton of Salem, essay on "Thoreau, Flagg and Burroughs."

Percival Lowell of Boston, an illustrated lecture "On Korea" (a native Korean was present on the stage, in national costume).

Edward Atkinson of Boston, a familiar talk upon the subject "Lack of Gumption."

John H. Sears, Flowering of plants, December, 1884.

W. J. Hoffman of Washington, D. C., "Hugo Ried's account of the Indians of Los Angeles, California, with notes by W. J. Hoffman."

William L. Welch, "Opening of Hatteras Inlet."

Oliver Thayer, "Early recollections of the upper portion of Essex Street, Salem."

Robert S. Rantoul, "Some material for a History of the Name and Family of Rentoul, Rintoul, Rantoul."

E. P. Crowell of Amherst, "The commission of the Captain of a Salem Privateer, in the Revolutionary war."

In addition to the lectures and communications presented at the meetings the following lectures have been delivered in the rooms of the Institute.

LECTURES. *Mrs. Schumacher* of Boston, an illustrated lecture "On the Madonna in Art," Tuesday, Nov. 11, 1884.

C. D. Hendrickson, an illustrated lecture "On the wonderland of America, the Yellowstone National Park," Monday, Dec. 8, 1884.

Edward S. Morse, six lectures on Japan and the Japanese, on Wednesdays, Dec. 17, 24, 31, 1884 and Jan. 7, 14, 21, 1885.

Mrs. Abby Sage Richardson, three lectures: first "Robert and Elizabeth (Barrett) Browning," Wednesday, Apr. 22, 1885; second, "Sir Walter Scott," Wednesday, Apr. 29; third, "The modern Spirit of Poetry," Wednesday, May 6.

LIBRARY.—The additions to the Library for the year (May, 1884, to May, 1885) have been as follows:

By Donation.

Folios,	13
Quartos,	263
Octavos,	1,531
Duodecimos,	543
Sexdecimos,	264
Octodecimos,	66
Total of bound volumes,	2,680
Pamphlets and serials,	11,635
Total of donations,	14,315

By Exchange.

Folios,	1
Quartos,	10
Octavos,	188
Duodecimos,	15
Total of bound volumes,	214
Pamphlets and serials,	2,483
Total of exchanges,	2,697

By Purchase.

Folios,	1
Quartos,	5
Octavos,	117
Duodecimos,	191
Sexdecimos,	60
Octodecimos,	6
Total of bound volumes,	380
Pamphlets,	7
Total of purchases,	387
Total of donations,	14,315
Total of exchanges,	2,697
Total of purchases,	387
Total of additions,	17,399

Of the total number of pamphlets and serials, 5,072 were pamphlets, and 9,053 were serials.

The donations to the Library for the year have been received from one hundred and seventy individuals and forty-six societies and governmental departments. The

exchanges from seven individuals and from one hundred and fifty-five societies and incorporate institutions, of which seventy-nine are foreign; also from editors and publishers.

The annual examination of the Library has been made and it is found to be in as good order and condition as our limited resources permit.

The accessions have been more numerous than for many years. Among what may be termed the customary donations may be classed the Congressional Record, documents, etc., from E. F. Stone representative U. S. Congress; congressional documents from the Department of the Interior, and others from the various departments of the government; Mass. State documents from the General Court Representatives; agricultural papers from the secretary of the Mass. Horticultural Society; the transactions of various societies; besides books and pamphlets in smaller or larger quantities from the members and others, a list of too great length to be read at this time.

Among special donations may be mentioned:— From Geo. R. Lord, a portion of the library of the late Nathl. Lord, amounting to 470 vols., and 2,384 pamphlets; among the latter, religious periodicals hold a prominent place. From the library of the late William Sutton, 1,319 vols., and 1,558 pamphlets, a donation very valuable in historical works and state documents. A collection of pamphlets from the estate of Robert and Elizabeth R. Peele. A nearly complete file of the Salem Register and 1,039 numbers of religious magazines from Chas. M. Richardson. Harper's Magazine and other periodicals to the number of 289 from Jas. A. Chamberlain. From the estate of Mrs. Martha P. Walcott, 95 vols., and 665 pamphlets, including periodicals. 67 volumes of scientific works from Mrs. Wm. S. Cleveland. From Mrs. M. C.

Farley, 48 vols., chiefly state and government documents. A large number of religious works and pamphlets from Rev. Hugh Elder. Some very valuable school books from Miss Elizabeth Lander. From Sam'l Chamberlain, besides volumes, religious and educational periodicals. Thirty religious works from Capt. George Upton. From Dr. William Mack an addition to the musical library as well as to other departments.

The Art Library is constantly receiving very valuable accessions of volumes and periodicals.

Our most excellent and efficient Assistant Librarian, whose usefulness we all recognize, has especially called my attention to the pressing necessity of more room. Almost every department is receiving from time to time, additions of more or less magnitude, and all are crowded to overflowing; there is scarcely a case where a proper arrangement of volumes or pamphlets can be made, on account of the limited room. One deep shelf has three rows of books; a case of newspapers has the space in the centre occupied with books piled up in bulk, and no access to them without removing the tier of papers in front; one can easily imagine the labor of finding a specified book of that lot.

The space reserved for the exchanges of foreign societies has for some time been filled to repletion.

A portion of our recent donations has been accommodated by putting up temporary shelves in the ante-room occupied by the historical museum. This, however, separates them from other books of the same class in the general library. Others are piled in bulk on the gallery floor, preventing their circulation and making them nearly inaccessible for reference.

The two cases at the rear of the lower hall have already double rows of directories on nearly every shelf.

From this statement of facts it can readily be seen how urgent is the need of greater accommodations and additional shelf-room.

Respectfully submitted,

WM. P. UPHAM,
Librarian.

Donations or exchanges have been received from the following:

	Vols.	Pam.
Adams, Miss Hannah C., Beverly,	11	
Adelaide, Royal Society of South Australia,		1
Agassiz, Alexander, Cambridge,		1
Albany, N. Y., State Library,	8	5
Alnwick, Eng., Berwickshire Naturalists' Club,		1
Altenburg, Naturforschende Gesellschaft des Osterlandes,		2
American Association for the Advancement of Science,	1	
American Ornithologists' Union,		4
Amherst College Library,		1
Anagnos, M., South Boston,		1
Andover Theological Seminary,		1
Andrews, William P.,		49
Archæological Institute of America,	1	1
Archer, Miss Rebecca, Newspapers,		
Auckland, N. Z., Auckland Institute,	1	
Baltimore, Md., Historical Society,	2	1
Baltimore, Md., Johns Hopkins University,		8
Baltimore, Md., Johns Hopkins University, Library of Historical and Political Science,		9
Baltimore, Md., Peabody Institute,		1
Bamberg, Naturforschende Gesellschaft,		1
Bancroft, Rev. C. F. P., Andover,		1
Batavia, K. Natuurkundige Vereeniging,	1	
Bayley, Miss Elizabeth S.,	15	
Bayley, Miss Harriet K., Boston,		17
Belfast, Ireland, Naturalists' Field Club,		1
Bell, Charles H., Exeter, N. H.,	1	2
Berkeley, Cal., University of California,		27
Berlin, Gesellschaft Naturforschender Freunde,		1
Berlin, Verein zur Beförderung des Gartenbaues,		52
Bern, Naturforschende Gesellschaft,		5

	Vols.	Pam
Blake, Francis E., Boston,		1
Bolles, Rev. E. C., D.D.,	7	397
Bonn, Naturhistorischer Verein,		2
Boston, American Academy of Arts and Sciences,		2
Boston, Appalachian Mountain Club,		2
Boston Board of Health,		12
Boston, Bostonian Society,		2
Boston, City of,	4	
Boston City Hospital,	1	1
Boston, Massachusetts General Hospital,		1
Boston, Massachusetts Historical Society,	2	
Boston, Massachusetts Horticultural Society,		3
Boston, Massachusetts Medical Society,		2
Boston, Massachusetts State Board of Health, Lunacy and Charity,	1	
Boston, Massachusetts State Library,	1	
Boston, National Association of Wool Manufacturers,		4
Boston, New England Historic, Genealogical Society,		5
Boston Overseers of the Poor,	1	
Boston Public Library,		3
Boston Scientific Society,		3
Boston Society of Natural History,		19
Boylston, E. D., Amherst,		1
Bradlee, Rev. C. D., Boston,		1
Bremen, Naturwissenschaftlicher Verein,		2
Bristol, Eng., Naturalists' Society,		2
Brooklyn, N. Y., Brooklyn Library,		5
Brown, Henry A.,	3	117
Browne, Albert G., Newspapers,		1
Brunswick, Me., Bowdoin College Library,		1
Bruxelles, Société Belge de Microscopie,	1	9
Bryant, James S., Hartford, Conn.,	2	
Buenos Aires, Sociedad Cientifica Argentina,	1	14
Buffalo, N. Y., Historical Society,	1	2
Buffalo, N. Y., Young Men's Association,		2
Caen, Académie des Sciences, Arts et Belles Lettres,		1
Calcutta, Geological Survey of India,		16
Cambridge, Harvard University Library,	1	4
Cambridge, Museum of Comparative Zoölogy,		8
Cambridge, Peabody Museum of American Archæology and Ethnology,	1	
Canada Royal Society,	1	
Cannon, H. W., Washington, D. C.,	1	

	Vols.	Pam.
Carpenter, Rev. C. C., Mt. Vernon, N. H.,		1
Cassel, Verein für Naturkunde,		1
Chamberlain, James A.,		289
Chamberlain, Samuel,	12	335
Champaign, Ill., State Laboratory of Natural History,		1
Chever, Miss S. A., Melrose,	1	
Chicago, Ill., Historical Society,	1	1
Chicago, Ill., Public Library,		1
Cincinnati, O., Society of Natural History,		4
Clarke, Rev. DeWitt S.,		1
Cleveland, Mrs. William S.,	67	
Cogswell, George, Bradford,	1	1
Cole, Mrs. N. D., Newspapers,		64
Collett, John, Indianapolis, Ind.,	2	
Conant, W. P., Washington, D. C., Newspapers,	2	68
Coolidge, Henry J., Boston,	1	8
Copenhague, Société Botanique,		5
Cordoba, Académie Nacional de Ciencias,		3
Courtenay, William A., Charleston, S. C.,	1	
Cowley, Charles, Lowell,		2
Cox, William R., Washington, D. C.,		3
Crowell, Rev. E. P., D.D., Amherst,	1	
Crunden, F. M., St. Louis, Mo.,		2
Currier, John M., Castleton, Vt.,		1
Cushing, Thomas, Boston,	1	
Cutter, A. E. Charlestown,		1
Danzig, Naturforschende Gesellschaft,		1
Darmstadt, Verein für Erdkunde,		1
Davenport, Ia., Academy of Natural Sciences,		1
Davis, Charles H. S., Meriden, Conn.,		1
Davis, James, Gloucester,	1	
Davis, R. S., & Co., Pittsburgh, Pa.,	1	
Dennett, W. S., Saco, Me.,		1
Denver, Colorado Scientific Society,		1
Dewing, Miss Mary E.,	1	2
Donnell, E. J., New York, N. Y.,		1
Doolittle, Miss E., Troy, N. Y.,		1
Dresden, Naturwissenschaftliche Gesellschaft, "Isis,"		2
Dublin, Royal Irish Academy,		5
Dublin, Royal Society,	1	13
Durkheim, Pollichia, Naturwissenschaftlicher Verein der Rheinpfalz,		4
Eaton, Mrs. C. F.,	11	58

	Vols.	Pam.
Eddy, Robert H., Boston,		1
Edinburgh, Royal Society,	2	
Elder, Rev. Hugh,	20	225
Ellery, Harrison, Chelsea,		1
Emden, Naturforschende Gesellschaft,		1
Emmerton, James A.,	1	14
Erfurt, K. Akademie gemeinnütziger Wissenschaften,		1
Erlangen, Physikalisch-medicinische Societät,		1
Essex, Eng., Essex Field Club,		2
Falmouth, Eng., Royal Cornwall Polytechnic Society,		1
Farley, Misses,		1
Farley, Mrs. M. C.,	48	
Fewkes, J. Walter, Cambridge,		2
Folger, William C., Nantucket,		2
Folsam, A. A., Boston,		9
Folwell, William W., Minneapolis, Minn.,		1
Foote & Horton, Newspapers,		
Forbes, S. A., Champaign, Ill.,		3
Francisco, Miss M. A.,	12	
Frankfurt, Senckenbergische Naturforschende Gesellschaft,	1	1
Freiburg, Naturforschende Gesellschaft,		1
French, A. D. Weld, Boston,	1	
Frothingham, T. G., Boston,		1
Garman, Samuel, Cambridge,		1
Genève, L'Institut National Genèvois,	2	
Giessen, Oberhessische Gesellschaft für Natur. u. Heilkunde,		1
Good, Peter B., Plainfield, N. J.,	1	
Goodell, Mrs. A. C., Jr., Newspapers,		52
Görlitz, Naturforschende Gesellschaft,	1	
Green, Samuel A., Boston,	18	580
Greenough, James C., Amherst,		1
Guss, A. L., Washington, D. C.,		2
Guthrie, Malcolm, Liverpool, Eng.,	1	
Halifax, Nova Scotian Institute of Natural Science,		1
Halle, K. Leopoldinisch—Carolinische deutsche Akademie der Naturforscher,		7
Halle, Naturwissenschaftlicher Verein für Sachsen u. Thüringen,		1
Hamburg, Naturwissenschaftlicher Verein,		3
Hamburg, Verein für Naturwissenschaftliche Unterhaltung,		1

	Vols.	Pam.
Hamilton, R. I., Narragansett Historical Publishing Company,		4
Harlem, Société Hollandaise des Sciences,		6
Hartford, Conn., Trinity College,		1
Hassam, John T., Boston,	1	
Hill & Nevins,		23
Hitchcock, E., Amherst,		8
Hobarton, Royal Society of Tasmania,	1	2
Howard, George E., Lincoln, Neb.,		1
Hunt, T. F.,	77	273
Huntoon, D. T. V., Canton,		2
Illinois Department of Agriculture,	6	6
Iowa City, Ia., State Historical Society,		1
Ipswich, Town of,	1	
Israel, Rev. Fielder, Newspapers,		13
James, U. P., Cincinnati, O.,		2
Kato, H., Tokio, Japan,		4
Kimball, Mrs. James,		2
Kingsley, J. S., Malden,		7
Kjöbenhavn, K. D. Videnskabernes Selskab,		2
Königsberg, Physikalisch-ökonomische Gesellschaft,		2
Lander, Miss Elizabeth,	45	43
Langworthy, Rev. I. P., Boston,		37
Lansing, Mich., Secretary of the State Board of Agriculture,	1	
Lansing, Mich., State Agricultural College,	2	1
Lansing, Mich., State Library,	16	7
Lausanne, Société Vaudoise des Sciences,		2
Lawrence, George N., New York, N. Y.,		3
Lawrence Public Library,		2
Lawrence, William, Washington, D. C.,	1	
Lee, F. H.,	2	446
Leeds, Josiah W., Philadelphia, Pa.,	1	
Leeds, Philosophical and Literary Society,		1
Le Mans, Société d'Agriculture Sciences et Arts de la Sarthe,		2
Liège, Société Royale des Sciences,		1
Lincoln Library Trustees,		1
Littlefield, George E., Boston,	25	
Locke, Silas M.,	1	
London, Eng., Conchological Society,		3
London, Eng., Royal Society,		6
Lord, George R.,	470	2384

	Vols.	Pam.
Lovell, W. H., Worcester,		1
Lowell, Old Residents' Association,		1
Lüneburg, Naturwissenschaftlicher Verein,		1
Luxembourg, L'Institut Royal Grand Ducal,	1	
Lyon, L'Académie des Sciences, Arts et Belles Lettres,	1	
Mack, William,	46	210
Madison, Wis., State Historical Society,	1	3
Madrid, Sociedad Española de Historia Natural,		4
Manchester, Eng., Literary and Philosophical Society,	2	3
Manchester, Rev. L. C., Lowell,		75
Manning, Miss Rebecca,	1	
Manning, Robert, Newspapers,		72
Marietta, O., Marietta College,		7
McDaniel, Rev. B. F.,	12	29
Meek, Henry M.,	2	
Melcher, B. Redford, Saco, Me.,		1
Meriam, H. C.,	1	
Merrill, William, Jr., West Newbury,		1
Mexico, Museo Nacional,		1
Milwaukee, Wis., City Public Museum,		4
Montreal, Natural History Society,		1
Morse, E. S.,		221
Münster, Westfälische Provinzial Verein,		1
Murdock, J. B., Philadelphia, Pa.,		1
Nashville, Tennessee Historical Society,		1
Neuchâtel, Société des Sciences Naturelles,	1	
Nevins, W. S., Newspapers,		
Newark, New Jersey Historical Society,	1	3
New Haven, Conn., Academy of Arts and Sciences,		1
New Haven, Conn., N. H. Colony Historical Society,		2
New Haven, Conn., Yale College Library,		3
New York, N. Y., Academy of Sciences,		2
New York, N. Y., American Geographical Society,		6
New York, N. Y., Astor Library,		1
New York, N. Y., Chamber of Commerce,		1
New York, N. Y., Genealogical and Biographical Society,		4
New York, N. Y., Linnæan Society,	1	
New York, N. Y., Mercantile Library Association,		3
New York, N. Y., Microscopical Society,		4
Nichols, Andrew, Jr., Danvers,		5
Northampton, Smith College,		1
Northend, William D.,	5	44
Norwegian North Atlantic Expedition, Editorial Committee,		1

	Vols.	Pam.
Nourse, Miss Dorcas C.,		2
Noyes, S. B., Brooklyn, N. Y.,	1	
Oliver, H. K.,	4	50
Osgood, John C., Newspapers,		
Ottawa, Geological and Natural History Survey,		7
Packard, A. S., Providence, R. I.,		1
Page, Miss Annie L., Danvers, Newspapers,		
Paltfray, C. W.,	3	270
Paris, Société d'Acclimatation,		12
Paris, Société d'Anthropologie,		3
Patch, Ira J.,	10	
Peaslee, John B., Cincinnati, O.,	1	1
Peele, Robert, Peele, Elizabeth R., } Estate of the late,	2	148
Peet, Rev. S. D., Clinton, Wis.,		6
Peirce, Henry B., Boston,	8	
Perkins, George A.,		12
Perley, Sidney, Boxford,		2
Perry, Rev. William Stevens, Davenport, Ia.,		1
Philadelphia, Pa., Academy of Natural Sciences,		29
Philadelphia, Pa., American Philosophical Society,		8
Philadelphia, Pa., Historical Society of Pennsylvania,		3
Philadelphia, Pa., Library Company,		2
Philadelphia, Pa., Numismatic and Antiquarian Society,		1
Philadelphia, Pa., Zoölogical Society,		2
Phillips, Henry, Jr., Philadelphia, Pa.,		2
Phillips, Stephen H.,		3
Phillips, Mrs. Stephen H.,		7
Pickering, Miss Mary O., Newspapers,	6	25
Pool, Wellington, Wenham,		3
Porter, Rev. E. G., Lexington,		1
Poughkeepsie, N. Y., Vassar Brothers' Institute,		1
Providence, Rhode Island Historical Society,	1	1
Providence, R. I., Public Library,		9
Putnam, Rev. A. P., D.D., Brooklyn, N. Y.,		3
Putnam, F. W., Cambridge, Newspapers,		20
Putnam, H. W.,	61	33
Rantoul, R. S., Newspapers,	30	197
Reeve, J. T., Appleton, Wis., Circular,		
Regensburg, K. Baierische Botanische Gesellschaft,	1	
Regensburg, Naturwissenschaftlicher Verein,		1
Rice, Franklin P., Worcester,		1
Richardson, Charles M., Newspapers,	1	1039
Richardson, F. P.,		6

	Vols.	Pam.
Richmond, Virginia Historical Society,	2	
Riga, Naturforschender Verein,		1
Robinson, John,		1
Robinson, Mrs. John,		35
Sale, John, Chelsea,	1	
Salem, Peabody Academy of Science, Newspapers,	5	380
Sampson, Davenport & Co., Boston,	96	
San Francisco, California Academy of Sciences,		2
San Francisco, Cal., Mercantile Library Association,		1
Sargent, Charles S., Brookline,		1
Sawyer, Samuel E., Gloucester,		1
Scudder, S. H., Cambridge,		1
S'Gravenhage, Nederlandsche Entomologische Vereeniging,		5
Shanghai, China Branch of the Royal Asiatic Society,		1
Sillars, Walter A., Danvers,		26
Smith, George Plumer, Philadelphia, Pa.,	5	2
Snell, Miss Annie E., Newspapers,		
Springfield, City Library Association,		1
Springfield, Mo., Drury College,		3
Stickney, George A. D.,	8	10
St. John, New Brunswick Natural History Society,		1
St. Louis, Mo., Academy of Science,		1
St. Louis, Mo., Historical Society,		1
St. Louis, Mo., Public School Library,		1
Stockholm, Entomologiska Föreningen,		3
Stockin, A. C., Boston,	1	
Stone, A. R., Maps,		
Stone, E. F., Washington, D. C.,	9	147
Stone, Miss Mary H.,		30
Stone, Robert, Newspapers,		
Story, Miss E. A.,		1
St. Paul, Minnesota Historical Society,	1	1
St. Pétersbourg, Académie Impériale des Sciences,		31
St. Petersburg, Imperial Botanical Garden,		2
St. Petersburg, Societas Entomologica Rossica,		1
Sutton, William, Estate of the late,	1319	1558
Sydney, Royal Society of New South Wales,	2	
Tasmania Government Statistician,	1	
Taunton, Eng., Somersetshire Archæological and Natural History Society,	1	
Taunton Public Library,		2
Titus, Rev. Anson, Amesbury,		1

	Vols.	Pam.
Tokio, Japan, Tokio Daigaku,		1
Topeka, Kan., State Board of Agriculture,	1	
Topeka, Kan., State Historical Society,		1
Topeka, Kan., Washburn College,		1
Toronto, Canadian Institute,		3
Tuckerman, L. S.,		52
Unknown,	8	16
Upham, William P.,	1	1
Upsal, Société Royale des Sciences,		1
Upton, George,	30	
Upton, Winslow, Providence, R. I.,		1
Urbano, O., Central Ohio Scientific Association,		1
U. S. Bureau of Education,	1	10
U. S. Chief of Engineers, Maps,	8	2
U. S. Chief Signal Office,	2	1
U. S. Coast and Geodetic Survey,	1	
U. S. Department of Agriculture,	2	
U. S. Department of the Interior,	66	2
U. S. Department of State,	3	11
U. S. Fish Commission,	1	
U. S. Geological Survey,	6	5
U. S. Life Saving Service,	1	
U. S. National Museum,		39
U. S. Naval Observatory,	1	1
U. S. Patent Office,	3	56
U. S. Postmaster General,	2	
U. S. Treasury Department,	1	
U. S. War Department,	3	
Vose, George L., Boston,		1
Wagner, E. C., Girardville, Pa.,		8
Walcott, Mrs. Martha P., Estate of the late,	95	665
Waring, George E., Jr., Newport, R. I.,		2
Washington, D. C., Bureau of Ethnology,	2	
Washington, D. C., Smithsonian Institution,	5	
Waters, J. Linton,		15
Waters, Misses,	5	
Waters, Stanley,		26
Waterville, Me., Colby University,		1
Watson, S. M., Portland, Me.,		6
Weston, Charles H.,	19	
Wheatland, Miss M. G.,	1	
Whipple, George M.,	1	1
Whipple, S. K., Newburyport,	1	4

	Vols.	Pam.
Whitcher, Mary, Shaker Village, N. H.,		13
Whitney, Mrs. H. M., Lawrence, Newspapers,		54
Whittier, Daniel B., Boston, Chart,		1
Whittredge, Charles E.,		1
Wien, K. K., Zoologisch-botanische Gesellschaft,	1	1
Wien, Verein zur Verbreitung Naturwissenschaftlicher Kenntnisse,	1	
Wiesbaden, Nassauischer Verein,	1	
Wilder, Marshall P., Boston,	4	
Willson, Rev. E. B.,	24	420
Winchell, N. H., Minneapolis, Minn.,	2	2
Winnipeg, Manitoba Historical and Scientific Society,		6
Winsor, Justin, Cambridge,		34
Winthrop, Robert C., Boston,		1
Woods, Mrs. Kate T.,	2	171
Worcester, American Antiquarian Society,		2
Wright, Harrison, Wilkes-Barre, Pa.,		3
Würzburg, Physikalisch-Medicinische Gesellschaft,	1	2

The following have been received from editors or publishers :—

American Journal of Science.
Bay State Monthly.
Cape Ann Bulletin.
Chicago Journal of Commerce.
Danvers Mirror.
Essex Co. Statesman.
Fireside Favorite.
Gardener's Monthly and Horticulturist.
Groton Landmark.
Ipswich Chronicle.
Lawrence American.
Lynn Bee.
Manifesto, The.
Marblehead Messenger.
Musical Herald.
Musical Record.
Nation, The.
Naturalists' Leisure Hour and Monthly Bulletin.
Nature.
Newton Transcript.
New York Chamber of Commerce Journal.
Our Dumb Animals.
Peabody Press.
Quaritch's Catalogue.
Sailors' Magazine and Seamen's Friend.
Salem Evening News.
Salem Evening Telegram.
Salem Gazette.
Salem Observer.
Salem Register.
Turner's Public Spirit.
Voice, The.
West Newbury Messenger.
Zoologischer Anzeiger.

HORTICULTURAL. The Trustees of the Essex Agricultural Society having accepted, for the second time, the invi-

tation of the authorities and citizens of Salem to hold their Annual Cattle Show and Fair at the "Willows" in Salem, Sept. 23 and 24, 1884, the Institute deemed it advisable to suspend its own horticultural exhibition and to unite cordially with the Trustees of the Agricultural Society in making their undertaking a success.

An account of the Exhibition will be found in the Transactions of the Agricultural Society for the year 1884.

MUSEUM. The specimens in natural history, including those in archæology, which have been received during the year have been placed on deposit with the Trustees of the Peabody Academy of Science, in accordance with previous arrangements. Those of an historical character, or which possess an artistic interest, have been placed in the rooms, and have been received from the following contributors:

The Peabody Academy of Science, Tennessee Historical Society, Miss Mary O. Pickering, Miss E. A. Story, Edwin N. Peabody, Dr. Wm. Mack, Miss C. Roberts of Philadelphia, Mr. Nathan Pierce, Miss Lizzie C. Ward of Boston (this donation is a crayon portrait of her brother, Gen. Fred Ward of Salem, who was killed in China in 1861, having risen to a high rank in the Chinese army; the portrait is neatly framed and now hangs in the western ante-room of Plummer Hall;) William R. Cloutman, E. S. Bowditch, R. S. Rantoul, Geo. M. Whipple, Geo. L. Ames, W. A. Keazar, Miss M. A. Francisco, E. N. Larrabee, T. F. Hunt, B. D. Hill and Amos Henfield.

THE ART EXHIBITION opened on Thursday, May 15, 1884, and closed on the 24th inst., the eighth under the auspices of the Institute. These exhibitions of Essex County work, vary in interest with each passing year.

The collection was smaller than that of the preceding, and the paintings of Benson, Barry and Whitney and a few others, who contributed then, were missed from the screens; however, the exhibition was quite attractive and many of the sea views were fine and well executed.

The following is the list of contributors:

Miss Mary Allen.
John P. Benson.
Mrs. C. A. Benjamin.
Miss Martha O. Barrett.
Miss M. C. Bolles.
Mrs. M. A. Bovie.
Miss M. M. Brooks.
Miss Anna N. Benjamin.
Bates & Brigham.
Miss M. J. Butler.
Miss Harriet E. Carlton, Cambridge.
Miss Lizzie Chever.
Miss C. M. Colcord, Swampscott.
Miss Ida Caller.
Miss A. L. Chadwick.
Miss E. W. Chadwick.
Joseph A. Davis.
Miss Ellen M. Dole.
" Grace G. Dalton.
" Edith Dalton.
" M. E. Dockham.
Arthur W. Dow, Ipswich.
Kilby W. Elwell, Gloucester.
W. B. Eaton.
Miss Lizzie J. Emery.
" A. Endicott.
" E. W. Fiske.
" C. S. Fiske.
" Elizabeth B. Gardner.
" Bessie W. Gardner.
" May Gardner.
" Carrie Goldthwaite.
" Grace D. Glidden, Wenham.
Sidney P. Guild, Lynn.
Mrs. George Harrington.
H. B. Harrington.
Miss Anna Hyde.
" Jennie Hyde.
Miss A. L. Hobbs, Haverhill.
" M. L. Hill.
" Lucy B. Hood.
" L. D. Harris.
G. W. Harvey.
Mrs. S. K. Hart.
Miss Edith Harlow.
Arthur Harlow.
E. D. Harlow.
Miss Mabel W. Haskell.
" Anna B. Holden, Providence, R. I.
Mrs. H. F. Jacobs.
Miss I. S. Jackson.
Frank R. Kimball.
Miss S. S. Kimball.
" Mary L. King.
" Louisa Lander.
Mrs. John H. Langmaid.
E. C. Larrabee.
Warren Marston, Gloucester.
Mrs. H. N. Mudge, Marblehead.
Ernest Machado.
Miss McMullen.
Miss T. R. Nason.
" Martha W. Nichols.
" Northend.
Mrs. T. M. Osborne.
Miss H. F. Osborne.
" E. T. Oliver.
" Bessie S. Osgood.
" Edith P. Pickering.
" Abbie G. Pingree.
" M. E. Phippen.
" Helen Philbrick.
" Anna B. Perkins.
" L. Perkins.
James Powers.
Miss Lottie Perkins.
" Minnie Pond.
" A. L. Pierson

Miss Elizabeth A. Pinnock.
" A. P. Pitman.
" A. M. Quimby.
C. C. Redmond.
Beverly Rantoul.
Miss Rantoul.
" Carrie L. Read.
" Lizzie L. Read.
Mrs. J. H. Roberts.
Miss M. E. Roberts.
" B. P. Smith.
" M. T. Smith.
" M. Simonds.
Mrs. N. G. Simonds.
Arthur L. Sanders.
Miss S. E. Smith.
Mrs. Joseph Symonds.
Miss A. C. Symonds.
" S. Sweetser.
" M. K. Stevens.
Mrs. G. L. Streeter.
Miss Delia Sheldon.
Mrs. S. E. Thayer.
Miss A. S. Tukey.
Miss I. F. Upton.
Miss L. L. A. Very.
" Gertrude M. Very.
Mrs. S. E. Varney.
Miss F. White.
Charles H. Woodbury, Lynn.
Mrs. K. T. Woods.
Henry Whipple.

Excursion.—On Wednesday, May 21, 1884, a party of fifty members and friends left Salem on an excursion to Mauch Chunk, Luray Cave, the Natural Bridge in Virginia and Washington. Vice President F. W. Putnam was with the party, and while at the Natural Bridge gave a lecture on the geology of that vicinity, stating his theory of the formation of the bridge. There are two ways by which ravines are cut. First, like that of Niagara and the cañons of Colorado and its tributaries. Secondly, like that of caves. The limestone of this region is probably lower silurian and the strata are tilted at many angles. Beginning at the Lace Water Falls, a mile above the bridge, the strata are vertical. They here begin to incline more and more towards the horizontal, which position is reached at the bridge. The limestone water, percolating through the fissures between the strata, acts both chemically and mechanically upon them, working out a deeper channel, and at the same time depositing incrusting matter as it seeks the level of drainage. This ravine was once a vast cave, the bridge being the only remaining relic of the

roof. This has stood because its limestone is more crystalline than that above and below it. It is flinty and is probably corniferous.

Stalactites and stalagmites are formed in the old chambers of the caves by the percolation of water through the fissures in the rocks, while the degradation and channeling are going on in the new chambers. In the case of the Natural Bridge, this action went on faster than the building process, hence the roof became too thin to sustain its weight and fell in, leaving the fragment forming the bridge to tell the story. The professor then told the company of the formation of caves in general, many of which he has explored, making particular mention of the Mammoth cave and of peculiar formations found in it.

Rev. B. F. McDaniel explained the formation of tufa and the varieties of incrusting minerals in caves. Col. H. C. Parsons, the proprietor, told of the caves in the neighborhood. Several of them have been opened, but not thoroughly explored. Until they can be properly opened up, he deems them unsafe for amateur explorers.

This estate of Mr. Parsons, of some 2,000 acres, comprises a horse-shoe range of lofty, wooded hills, enclosing the basin on whose slopes lie the hotels and the owner's residence. The Horse Shoe opens towards the east and commands a grand and beautiful view of the Blue Ridge, forest-covered and mist-crowned, rising 4,300 feet above the sea. A little to the left the glint of broken granite alone shows where the river burst through, and at the right the crest lowers so that the Peaks of Otter may overlook.

The Groveland Flower Mission, thirty-eight in number, ladies and gentlemen, came to Salem June 24 by joint invitation of the Peabody Academy of Science and the Essex Institute.

They were entertained by the two societies and visited the various points of interest in and about Salem.

FINANCIAL.—The following is the Treasurer's Report of the receipts and expenditures of the past year (condensed for printing):

RECEIPTS.

Balance of last year's account		$0 94
Income of General account,		
Assessments of members,	$811 00	
Publications,	146 33	
Use of Hall, Excursions, etc.,	218 35	
Bank Dividend,	20 00	
Return State tax,	8 91	
Salem Athenæum, portion of expense,	296 40	
		1,490 99
Income of Historical Fund,	12 00	
" " Nat. Hist. Soc. Fund,	56 00	
" " Davis Fund,	392 68	
" " Ditmore Fund,	180 40	
" " Manuscript Fund,	26 96	
" " Ladies' Fair Fund,	60 00	
" " Derby Fund,	17 30	
" " Howes Fund,	1,450 00	
" " Story Fund,	563 00	
		2,718 34
Bequest of Robert Peele and sister	2,000 00	
Income from the same,	135 00	
		2,135 00
Balance due the Treasurer,		117 52
		$6,462 79

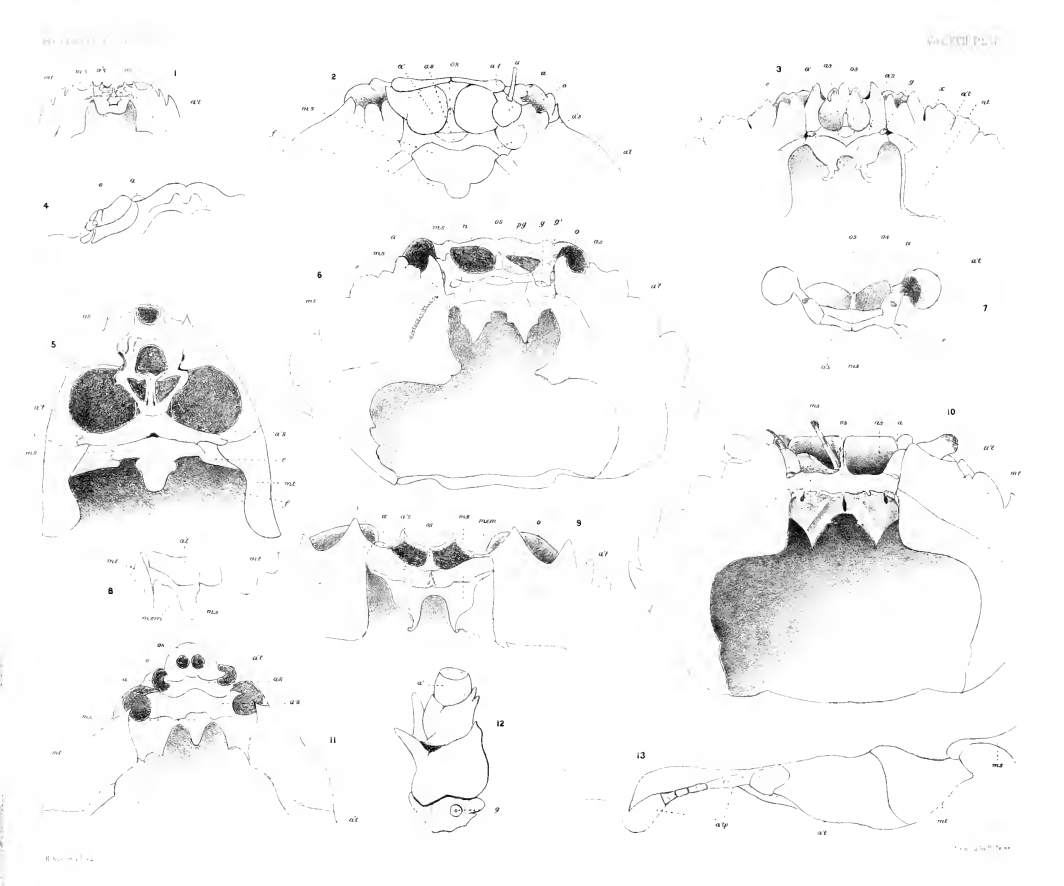
EXPENDITURES.

Paid on General Account.

Salaries,	1,882 00	
Publications,	807 07	
Fuel and Gas,	233 53	
Binding, Printing, Stationery, etc.,	119 37	
Repairs, expressage, etc.,	171 38	
Fire Insurance prem.,	122 50	
Salem Athenæum, as per agreement,	350 00	
		3,685 85
Paid on Historical account,	53 25	
" " Nat. Hist. account,	53 25	
		106 50
" " Ditmore annuity,	110 00	
Paid Legatee—Augustus Story's Estate,	563 00	
		673
Interest Davis fund, funded in Savings Bank,	12 68	
Interest Manuscript fund, funded in Savings Bank,	26 96	
Interest Derby fund, funded in Savings Bank,	17 30	
Deposit Salem Savings Bank, part of Robert Peele and sister's legacy,	1,500 00	
		1,556 94
Paid note at Salem National Bank and Interest,	410 50	410 50
		$6,432 79
The invested funds are now,		$47,389 51

Examined and approved by the Auditor, May 18, 1885.

The secretary in concluding his report says, "In addition to the accumulations of former years which it has been impossible to arrange on the shelves for want of room, there have been added since the last annual meeting, many books and a great collection of pamphlets, to say nothing of the large amount of printed matter, such as circulars, notices, etc. The subject of increased accommodations is, it is true, an old story, but as donations continue to flow into the building the necessity of more shelf-room forces itself on the attention of the officers of the Institute and those who frequent the library. The subject is again brought to the attention of the directors in the hope that before another year shall have passed, some decided action in this direction will be taken."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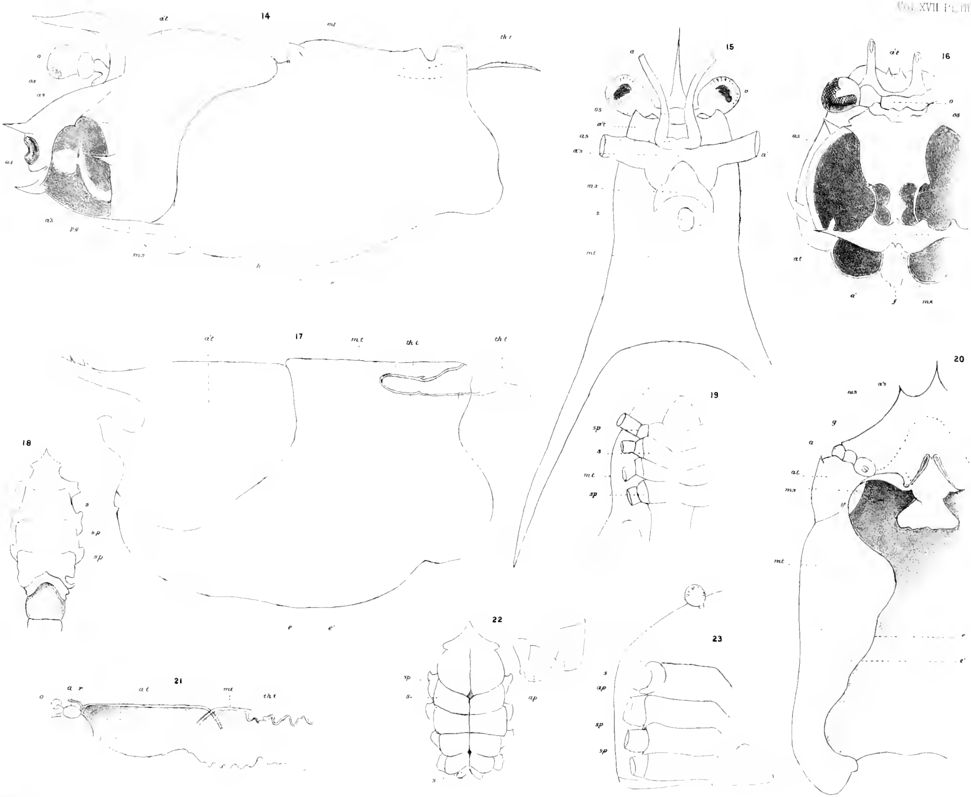
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BULLETIN

OF THE

ESSEX INSTITUTE.

VOL. 17. SALEM: JULY, AUG., SEPT., 1885. NOS. 7–9.

INDIAN GAMES.

BY ANDREW MCFARLAND DAVIS.

"THERE are," says Father Brebeuf in his account of what was worthy of note among the Hurons in 1636,[1] "three kinds of games particularly in vogue with this people; cross, platter, and straw. The first two are, they say, supreme for the health. Does not that excite our pity? Lo, a poor sick person, whose body is hot with fever, whose soul foresees the end of his days, and a miserable sorcerer orders for him as the only cooling remedy, a game of cross. Sometimes it is the invalid himself who may perhaps have dreamed that he will die unless the country engages in a game of cross for his health. Then, if he has ever so little credit, you will see those who can best play at cross arrayed, village against village, in a beautiful field, and to increase the excitement, they will wager with each other their beaver skins and their necklaces of porcelain beads."

"Sometimes also one of their medicine men will say that the whole country is ill and that a game of cross is

[1] Relations des Jesuites, Québec, 1858, p. 113.

needed for its cure. It is not necessary to say more. The news incontinently spreads everywhere. The chiefs in each village give orders that all the youths shall do their duty in this respect, otherwise some great calamity will overtake the country."

LACROSSE.

In 1667, Nicolas Perrot, then acting as agent of the French government, was received near Sant Sainte Marie with stately courtesy and formal ceremony by the Miamis, to whom he was deputed. A few days after his arrival, the chief of that nation gave him, as an entertainment, a game of lacrosse.[2] "More than two thousand persons assembled in a great plain each with his cross. A wooden ball about the size of a tennis ball was tossed in the air. From that moment there was a constant movement of all these crosses which made a noise like that of arms which one hears during a battle. Half the savages tried to send the ball to the northwest the length of the field, the others wished to make it go to the southeast. The contest which lasted for a half hour was doubtful."

In 1763, an army of confederate nations, inspired by the subtle influence of Pontiac's master mind, formed the purpose of seizing the scattered forts held by the English along the northwestern frontier. On the fourth day of June of that year, the garrison at Fort Michilimackinac, unconscious of their impending fate, thoughtlessly lolled at the foot of the palisade and whiled away the day in watching the swaying fortunes of a game of ball which was being played by some Indians in front of the stockade. Alexander Henry, who was on the spot at the time,

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[2] Histoire de l'Amérique Septentrionale par M. de Bacqueville de la Potherie, Paris, 1722, Vol. II, 124 *et seq.*

says that the game played by these Indians was "Baggatiway, called by the Canadians *le jeu de la Crosse*."[3]

Parkman[4] concludes a vivid description of the surprise and massacre of the garrison at Michilimackinac, based upon authentic facts, as follows: "Rushing and striking, tripping their adversaries, or hurling them to the ground, they pursued the animating contest amid the laughter and applause of the spectators. Suddenly, from the midst of the multitude, the ball soared into the air and, descending in a wide curve, fell near the pickets of the fort. This was no chance stroke. It was part of a preconcerted scheme to insure the surprise and destruction of the garrison. As if in pursuit of the ball, the players turned and came rushing, a maddened and tumultuous throng, towards the gate. In a moment they had reached it. The amazed English had no time to think or act. The shrill cries of the ball-players were changed to the ferocious war-whoop. The warriors snatched from the squaws the hatchets which the latter, with this design, had concealed beneath their blankets. Some of the Indians assailed the spectators without, while others rushed into the fort, and all was carnage and confusion."

Thus we see that the favorite game of ball of the North American Indians, known to-day, as it was in 1636, by the name of "lacrosse," was potent among them as a remedial exercise or superstitious rite to cure diseases and avert disaster; that it formed part of stately ceremonials which were intended to entertain and amuse distinguished guests; and that it was made use of as a stratagem of war,

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[3] Travels and Adventures in Canada, etc., by Alexander Henry. New York, 1809, p. 78; Travels through the Inverior parts of North America, by Jonathan Carver London, 1778, p. 19. The Book of the Indians, by Samuel G. Drake, Boston, 1841, Book v, Ch. III, p. 52.

[4] The Conspiracy of Pontiac, by Francis Parkman. Boston, 1870. Vol. I. p. 339.

by means of which to lull the suspicions of the enemy and to gain access to their forts.

The descriptions of lacrosse which have been transmitted to us, would often prove unintelligible to one who had never seen the game played. The writers of the accounts which have come down to us from the early part of the seventeenth century were men whose lives were spent among the scenes which they described and they had but little time, and few opportunities for careful writing. The individual records though somewhat confused enable us easily to identify the game, and a comparison of the different accounts shows how thoroughly the main features of the game have been preserved.

Lacrosse is played to-day as follows: The number of players on the opposing sides should be equal. Regular stations are assigned in the rules for playing the game, for twelve on each side. Goals, each consisting of two upright posts or staffs, generally about six feet apart and of equal height, are planted at each end of the field. The length of the field and its bounds are determined by the character of the ground and the skill of the players. The effort of each side is to prevent the ball from passing through the goal assigned to its protection, and equally to try to drive it through the opposite goal. Under no circumstances can the ball be touched during the game, while within the bounds, by the hands of the players. Each player has a racket, the length of which, though optional, is ordinarily from four to five feet. One end of this racket or bat is curved like a shepherd's crook, and from the curved end a thong is carried across to a point on the handle about midway its length. In the space thus enclosed between the thong and the handle, which at its broadest part should not exceed a foot in width, a flat network is interposed. This forms the bat. It is with

this that the player picks up and throws the ball used in the game, which should be about eight or nine inches in circumference. The ball is placed in the centre of the field by the umpire, and when the game is called, the opposing players strive to get possession of it with their rackets. The play consists in running with it and throwing it, with the design of driving it between the adversary's goal posts; and in defensive action, the purpose of which is to prevent the opponents from accomplishing similar designs on their part. As the wind or the sunlight may favor one side or the other on any field, provision is generally made for a change of goals during the match. The stations of the players and the minor rules of the game are unimportant in this connection.

The oldest attempt at a detailed description of the game is given by Nicolas Perrot who from 1662 to 1699 spent the greater part of his time as *coureur de bois*, trader, or government agent, among the Indians of the far West. It is of him that Abbé Ferland says, "Courageous man, honest writer and good observer, Perrot lived for a long time among the Indians of the West who were very much attached to him." His accounts of the manners and customs of the North American Indians have been liberally used by subsequent writers and as the part treating of games is not only very full but also covers a very early period of history, it is doubly interesting for purposes of comparison with games of a later day. He[5] says, "The savages have many kinds of games in which they delight. Their natural fondness for them is so great that they will neglect food and drink, not only to join in a game but even to look at one. There is among them a certain game

[5] Memoire sur les Moeurs, Coustumes et Religion des Sauvages de l'Amérique Septentrionale, par Nicolas Perrot, Leipzig et Paris, 1864, p. 13, *et seq.*

of cross which is very similar to our tennis. Their custom in playing it is to match tribe against tribe, and if the numbers are not equal they render them so by withdrawing some of the men from the stronger side. You see them all armed with a cross, that is to say a stick which has a large portion at the bottom, laced like a racket. The ball with which they play is of wood and of nearly the shape of a turkey's egg. The goals of the game are fixed in an open field. These goals face to the east and to the west, to the north and to the south." Then follows a somewhat confused description of the method and the rules of the contest from which we can infer that after a side had won two goals they changed sides of the field with their opponents, and that two out of three, or three out of five goals decided the game.

Reading Perrot's description in connection with that given by de la Potherie of the game played before Perrot by the Miamis, helps us to remove the confusion of the account. Abbé Ferland[6] describes the game. He was a diligent student of all sources of authority upon these subjects and was probably familiar with the modern game. His account of the Indian game follows that of Perrot so closely as to show that it was his model. It is, however, clear and distinct in its details, free from the confusion which attends Perrot's account and might almost serve for a description of the game as played by the Indians to-day. Perrot was a frontier-man and failed when he undertook to describe anything that required careful and exact use of language. We can only interpret him intelligently by combining his descriptions with those of other writers and applying our own knowledge of the game as we see it to-day. He is, however, more intelligible

[6] Cours d'Histoire du Canada, par J. B. A. Ferland, Québec, 1861, Vol. I, p. 14.

when he gets on more general ground, and after having disposed of the technicalities of the game, he proceeds: "Men, women, boys and girls are received on the sides which they make up, and they wager between themselves more or less according to their means."

" These games ordinarily begin after the melting of the ice and they last even to seed time. In the afternoon one sees all the players bedecked[7] and painted. Each party has its leader who addresses them, announcing to his players the hour fixed for opening the game. The players assemble in a crowd in the middle of the field and one of the leaders of the two sides, having the ball in his hands casts it into the air. Each one then tries to throw it towards the side where he ought to send it. If it falls to the earth, the player tries to draw it to him with his cross. If it is sent outside the crowd, then the most active players, by closely pursuing it, distinguish themselves. You hear the noise which they make striking against each other and warding off blows, in their strife to send the ball in the desired direction. When one of them holds the ball between his feet, it is for him, in his unwillingness to let it go, to avoid the blows which his adversaries incessantly shower down upon his feet. Should he happen to be wounded at this juncture, he alone is responsible for it. It has happened that some have had their legs broken, others their arms and some have been killed. It is not uncommon to see among them those who are crippled for life and who could only be at such a game by an

[7] I translate *apiffez*, "bedecked," assuming from the context that the author meant to write "*attifez*." We have, elsewhere, accounts which show that ball-players, even though compelled to play with scant clothing, still covered themselves with their ornaments. J. M. Stanley in his Portraits of North American Indians, Smithsonian Miscellaneous Collections, Washington. 1862, Vol. II, p. 13, says that the "Creek" ball-players first appear on the ground in costume. "During the play they divest themselves of all their ornaments which are usually displayed on these occasions for the purpose of betting on the result of the play."

act of sheer obstinacy. When accidents of this kind happen, the unfortunate withdraws quietly from the game if he can do so. If his injury will not permit him, his relations carry him to the cabin and the game continues until it is finished as if nothing had happened."

"When the sides are equal the players will occupy an entire afternoon without either side gaining any advantage; at other times one of the two will gain the two games that they need to win. In this game you would say to see them run that they looked like two parties who wanted to fight. This exercise contributes much to render the savages alert and prepared to avoid blows from the tomahawk of an enemy, when they find themselves in a combat. Without being told in advance that it was a game, one might truly believe that they fought in open country. Whatever accident the game may cause, they attribute it to the chance of the game and have no ill will towards each other. The suffering is for the wounded, who bear it contentedly as if nothing had happened, thus making it appear that they have a great deal of courage and are men."

"The side that wins takes whatever has been put up on the game and whatever there is of profit, and that without any dispute on the part of the others when it is a question of paying, no matter what the kind of game. Nevertheless, if some person who is not in the game, or who has not bet anything, should throw the ball to the advantage of one side or the other, one of those whom the throw would not help would attack him, demanding if this is his affair and why he has mixed himself with it. They often come to quarrels about this and if some of the chiefs did not reconcile them, there would be blood shed and perhaps some killed."

Originally, the game was open to any number of com-

petitors. According to the Relation of 1636, "Village was pitted against village." "Tribe was matched against tribe," says Perrot. The number engaged in the game described by La Potherie[8] was estimated by him at two thousand. LaHontan[9] says that "the savages commonly played it in large companies of three or four hundred at a time," while Charlevoix[10] says the number of players was variable and adds "for instance if they are eighty," thus showing about the number he would expect to find in a game. When Morgan[11] speaks of six or eight on a side, he must allude to a later period, probably after the game was modified by the whites who had adopted it among their amusements.[12]

Our earliest accounts of the game as played by the Indians in the south are about one hundred years later than the corresponding records in the north. Adair[13] says the

[8] Vol. II, p. 126.

[9] Mémoires de L'Amérique Septentrionale, ou la Suite des Voyages de Mr. Le Baron de LaHontan, Amsterdam, 1705, Vol. II, p. 113.

[10] Histoire de la Nouvelle France. Journal d'un Voyage, etc., par le P. de Charlevoix, Paris, 1744, Vol. III, p. 319.

[11] League of the Iroquois, by Lewis H. Morgan, Rochester, 1851, p. 294.

[12] The game is also mentioned in An Account of the Remarkable Occurrences in the Life and Travels of Col. James Smith during his Captivity with the Indians in the years 1755-1759. Cincinnati, 1870, p. 78. It is described by Col. William L. Stone in his Life of Brant, Albany, 1865, Vol. II, p. 448. In one game of which he speaks, the ball was started by a young and beautiful squaw who was elaborately dressed for the occasion. Notwithstanding the extent and value of Col. Stone's contributions to the literature on the subject of the North American Indians, he makes the erroneous statement that "The Six Nations had adopted from the Whites the popular game of ball or cricket." See p. 415, same volume, *c.f.* The Memoir upon the late War in North America, 1755-1760, by M. Pouchot, translated and edited by Franklin B. Hough, Vol. II, p. 135. A game of ball is also described in Historical Collections of Georgia, by the Rev. George White, 3d edition, New York, 1855, p. 670, which took place in Walker County, Georgia, between Chatooga and Chicamauga. The ball was thrown up at the centre. The bats were described as curiously carved spoons. If the ball touched the ground the play stopped and it was thrown up again. Rev. J. Owen Dorsey in a paper entitled "Omaha Sociology," printed in the Third Annual Report of the Bureau of Ethnology, etc., 1881-1882, Washington, 1884, §230, p. 336, describes the game amongst the Omahas.

[13] The History of the American Indians, particularly those Nations adjoining to the Mississippi, etc., by James Adair, London, 1775, p. 399.

gamesters are equal in number and speaks of "the crowd of players" preventing the one who "catches the ball from throwing it off with a long direction." Bossu[14] says, "they are forty on each side," while Bartram[15] says, "the inhabitants of one town play against another in consequence of a challenge." From this it would seem that among those Indians, as at the North, the number of players was governed only by the circumstances under which the game was played.

The ball, originally of wood,[16] was replaced by one made of deer skin. Adair gives the following description of its manufacture: "The ball is made of a piece of scraped deer-skin, moistened, and stuffed hard with deer's hair, and strongly sewed with deer's sinews."[17]

According to Morgan the racket has undergone a similar change, from a curved wooden head to the curved stick with open network, but we have seen in the earliest description at our command, that in the days of Perrot the cross was "laced like a racket."[18]

The game was played not only by the Indians of our Coast, but Powers[19] found it also among the Californian Indians. He describes a game of tennis played by the Pomo Indians in Russian River Valley, of which he had heard nothing among the northern tribes. "A ball is rounded out of an oak knot as large as those used by school boys, and it is propelled by a racket which is constructed of a

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[14] Travels through that Part of North America formerly called Louisiana, by Mr. Bossu, Captain in the French Marines. Translated from the French by John Reinhold Forster, London, 1771, Vol. I, p. 304.

[15] Travels through North and South Carolina, etc., by William Bartram, Philadelphia, 1791, p. 508.

[16] La Potherie, Vol. II, p. 126; Perrot, p. 44.

[17] p. 400.

[18] League of the Iroquois, p. 298; Perrot p. 44.

[19] Contributions to North American Ethnology, Vol. III, p. 151. Tribes of California by Stephen Powers; The same game is described among the Meewocs in The Native Races of the Pacific States by H. H. Bancroft, Vol. I, p. 393.

long slender stick, bent double and bound together, leaving a circular hoop at the extremity, across which is woven a coarse meshwork of strings. Such an implement is not strong enough for batting the ball, neither do they bat it, but simply shove or thrust it along the ground."

Paul Kane[20] describes a game played among the Chinooks. He says "They also take great delight in a game with a ball which is played by them in the same manner as the Cree, Chippewa and Sioux Indians. Two poles are erected about a mile apart, and the company is divided into two bands armed with sticks, having a small ring or hoop at the end with which the ball is picked up and thrown to a great distance, each party striving to get the ball past their own goal. They are sometimes a hundred on a side, and their play is kept up with great noise and excitement. At this play they bet heavily as it is generally played between tribes or villages."

Domenech[21] writing about the Indians of the interior, calls the game "cricket," and says the players were costumed as follows: "Short drawers, or rather a belt, the body being first daubed over with a layer of bright colors; from the belt (which is short enough to leave the thighs free) hangs a long tail, tied up at the extremity with long horse hair; round their necks is a necklace, to which is attached a floating mane, dyed red, as is the tail, and falling in the way of a dress fringe over the chest and shoulders. * * In the northwest, in the costume indispensable to the players, feathers are sometimes substituted for horse hair." He adds "that some tribes play with two sticks" and that it is played in "winter on the ice." "The ball is made of wood or brick covered with kid-skin leather, sometimes of

[20] Wanderings of an Artist among the Indians of North America by Paul Kane, p. 190; H. H. Bancroft's Native Races, Vol. I, p. 244.

[21] Seven Years' Residence in the Great Deserts of North America by the Abbé Em. Domenech, Vol. II, pp. 132, 136.

leather curiously interwoven." Schoolcraft describes the game as played in the winter on the ice.[22]

It will be observed that the widest difference prevails in the estimate of the distance apart at which the goals are set. Henry, in his account of the game at Michilimackinac says "they are at a considerable distance from each other, as a mile or more." Charlevoix places the goals in a game with eighty players at "half a league apart" meaning probably half a mile. LaHontan estimates the distance between the goals at "five or six hundred paces." Adair,[23] who is an intelligent writer, and who was thoroughly conversant with the habits and customs of the Cherokees, Choctaws, and Chicasaws estimates the length of the field at "five hundred yards," while Romans[24] in describing the goals uses this phrase "they fix two poles across each other at about a hundred and fifty feet apart." Bossu[25] speaks as if in the game which he saw played there was but a single goal. He says "They agree upon a mark or aim about sixty yards off, and distinguished by two great poles, between which the ball is to pass."

The goals among the northern Indians were single posts at the ends of the field. It is among the southern Indians that we first hear of two posts being raised to form a sort of gate through or over which the ball must pass. Adair says, "they fix two bending poles into the ground, three yards apart below, but slanting a considerable way out-

[22] Schoolcraft's North American Indians, Vol II, p. 78; See also Ball-play among the Dacotas, in Philander Prescott's paper, Ibid, Vol. IV, p. 64.

[23] Henry, p. 78; Charlevoix Vol. III, p. 319; Kane's Wanderings, p. 189; LaHontan, Vol. II, p. 113; Adair, p. 400.

[24] A concise Natural History of East and West Florida, by Capt. Bernard Romans, New York, 1776, p. 79.

[25] Vol. I, p. 304; Similarly, Pickett (History of Alabama, Vol. I, p. 92) describes a game among the Creeks in which there was but one goal, consisting of two poles erected in the centre of the field between which the ball must pass to count one. He cites "Bartram," and the "Narrative of a Mission to the Creek Nation by Col. Marinus Willett," as his authorities. Neither of them sustains him on this point.

wards. The party that happens to throw the ball over these counts one; but if it be thrown underneath, it is cast back and played for as usual." The ball is to be thrown "through the lower part" of the two poles which are fixed across each other at about one hundred and fifty feet apart, according to Romans. In Bossu's account it is "between" the two great poles which distinguish the mark or aim, that "the ball is to pass." On the other hand, Bartram, describing what he saw in North Carolina, speaks of the ball "being hurled into the air, midway between the two high pillars which are the goals, and the party who bears off the ball to their pillar wins the game."

In some parts of the south each player had two rackets between which the ball was caught. For this purpose they were necessarily shorter than the cross of the northern Indians. Adair says, "The ball sticks are about two feet long, the lower end somewhat resembling the palm of a hand, and which are worked with deer-skin thongs. Between these they catch the ball, and throw it a great distance."[26]

That this was not universal throughout the south would appear from Bossu's account who says, "Every one has a battledoor in his hand about two feet and a half long, made very nearly in the form of ours, of walnut, or chestnut wood, and covered with roe-skins." Bartram also says that each person has "a racquet or hurl, which is an implement of a very curious construction somewhat resembling a ladle or little hoop net, with a handle near three feet in length, the hoop and handle of wood and the netting of thongs of raw-hide or tendons of an animal."

Catlin[27] saw the game played by the Choctaws on their

[26] Adair, p. 400; A Narrative of the Military Adventures of Colonel Marinus Willett, p. 109.

[27] Letters and Notes on the Manners, Customs and Condition of the North American Indians, by George Catlin, Vol. II, p. 123 *et seq.*

Western Reservation. They used two rackets. In this game the old men acted as judges.

The game was ordinarily started by tossing the ball into the air in the centre of the field. This act is represented by Perrot as having been performed by one of the leaders in the game, but it is more in accord with the spirit in which the game was played, that it should have been done by some outsider. Bossu says, "An old man stands in the middle of the place appropriated to the play, and throws up into the air a ball of roe-skins rolled about each other," while Powers[28] says that among the Californian Indians this act was performed by a squaw. The judges started the ball among the Choctaws.[29] Notwithstanding the differences in the forms of the goals, their distance apart and the methods of play disclosed in all these descriptions, the game can only be regarded as the same. The historians who have preserved for us the accounts of the ancient southern games from which quotations have been made, are all Englishmen except Bossu, and he entered the country not by the way of Quebec but by way of New Orleans. It is not strange, therefore, that we do not find in use amongst them the name which the early French fathers and traders invariably applied to the game. The description, however, given by these writers, of the racket used in the south, corresponds so closely with the crook from which the game took the name by which it is known, that we must accept the game as a modified form of lacrosse. From Maine to Florida, from the Atlantic to the Pacific, we trace a knowledge of it. We have found it in use among the confederate nations of the north and of the south and among scattered tribes throughout the country.

In the majority of instances the natural instincts of those

[28] Contributions to North American Ethnology, Vol. III, p. 151.
[29] Catlin, Vol. II, p. 120.

who participated in the strife were stimulated by local pride. The reputation of their tribe or their village rested upon the result. Ardent as the spirit of the contest must necessarily have been under such circumstances, among a people where courage and physique counted for so much, their intense passion for gambling intervened to fan into fiercer flames the spirits of the contesting players and to inspire them to more earnest efforts. Stakes, often of the utmost consequence to the players and their backers, were wagered upon the games. A reputation for courage, for skill and for endurance, was the most valuable possession of the Indian. The maintenance of this was to a certain extent involved in each game that he played. Oftentimes in addition to this, all of his own possessions and the property of his friends and neighbors in the form of skins and beads were staked upon the result of the contest. In games where so much was involved, we need not be surprised to learn from Perrot that limbs were occasionally broken and that sometimes players were even killed. In the notes to Perrot's Memoir it is stated that some anonymous annotator has written across the margin of Perrot's manuscript at this point :[30] "False, neither arms nor legs are broken, nor are players ever killed." We scarcely need the corroboratory statements of La Potherie[31] that "these games are ordinarily followed by broken heads, arms and legs, and often people are killed at them;" and also of LaHontan,[32] that "they tear their skins and break their legs" at them, to satisfy us that Perrot rather than his critic is to be believed. If no such statements had been made, we should infer that so violent a game, on which stakes of such vital importance were placed, could not be played by a people like the Indians, except with such results.

[30] Perrot, Note I, Ch. x, p. 187. [31] Vol. II, pp. 126-127. [32] Vol. II, p. 113.

Notwithstanding the violence of the game and the deep interest which the players and spectators took in it, the testimony of historians is uniform to the effect that accidental injuries received during its progress produced no ill will. We have seen that Perrot states that if anyone attempted to hold the ball with his feet, he took his chance of injury, and that those who were injured retired quietly from the field. Adair says, "It is a very unusual thing to see them act spitefully, not even in this severe and tempting exercise." Bossu bears testimony to the same effect, in the following words: "The players are never displeased; some old men, who assist at the play, become mediators, and determine that the play is only intended as a recreation, and not as an opportunity of quarrelling."

Where the game was played by appointment in response to a challenge, the men and women assembled in their best ornaments, and danced and sang during the day and night previous to that of the appointed day. The players supplicated the Great Spirit for success. Female relations chanted to him all the previous night and the men fasted from the previous night till the game was over.[33] The players wore but little in the way of covering. Romans speaks of them as being "almost naked, painted and ornamented with feathers;" and Bossu says they were "naked, painted with various colours, having a tyger tail fastened behind, and feathers on their heads and arms."

It is not astonishing that a game which called for such vigorous exercise[34] and which taxed the strength, agility and endurance of the players to such a degree, should be described by writers in terms which showed that they

[33] Adair, p. 401; Bossu, Vol. i, p. 304; and Willett's Narrative p. 109.

[34] Ferland, Vol. i, p. 134, and Major C. Swan in a Report concerning the Creeks in 1791, Schoolcraft, Vol. v, p. 277, assert that the Whites excel the Indians at this game.

looked upon it rather in the light of a manly contest than as an amusement. Nevertheless the young people and the women often took part in it. Perrot tells us so, and both Romans and Bossu say that after the men were through, the women usually played a game, the bets on which were generally high. Powers[35] represents the squaws among the Californian Indians as joining the game.

Dexterity in the game lay in the skilful use of the racket; in rapid running; in waylaying an adversary when he was in possession of the ball; in avoiding members of the opposing side when the player himself was running with the ball for the goal, and in adroitly passing the ball to one of the same side when surrounded by opponents. To give full scope to skill in the use of the racket, great stress was laid upon the rule that the ball was not to be touched by the hand. Perrot says, "if it falls to the earth he tries to draw it to him with his cross." Charlevoix says, "Their business is to strike the ball to the post of the adverse party without letting it fall to the ground and without touching it with the hand." Adair says, "They are not allowed to catch it with their hands."

The early writers were struck with the fact that the character of the exercise in this game was fitted to develop the young warriors for the war path, and they commented on the practice that they thus acquired in rapid running and in avoiding blows from an instrument in the hands of an adversary.

When we review the various features of the game which its chroniclers have thought worthy of record, we can but conclude that it was rather a contest of grave importance to the players than a mere pastime, nor can we fail to accept the concurrent testimony as to the widespread terri-

[35] Contributions to North American Ethnology, Vol. III, p. 151.

tory in which it was domesticated, as additional evidence of the extent of the intercourse which prevailed among the native tribes of this country.

PLATTER OR DICE.

The second in the list of games given by Father Brebeuf is that which he calls "platter." Writers who describe the habits of the Indians at the north have much to say concerning this game. According to Lescarbot, Jacques Cartier saw it played, and recorded his observations.[36]

Sagard Theodat [37] devotes considerable space to it. Both Father Brebeuf, in his Relation in 1636, and Father Lalemant, in his Relation in 1639, give long accounts of the game, the causes for its being played, the excesses in gambling to which it leads, and the methods which prevail in its practice. In Perrot's[38] work there is a good description of the game, although not so full as his account of lacrosse, from which we have already quoted. La Potherie and LaHontan barely mention it. Lafitau[39] in his searching analysis of the manuscripts deposited at Quebec, while seeking for traces of his theory that a resemblance existed between the habits of the Indians and those of the ancient dwellers in eastern Europe, found an unusual quantity of material bearing on this particular topic, which he has reproduced in his book. Charlevoix[40], in a letter dated June 8, 1721, says, "As I was returning through a quarter of the Huron village, I perceived a number of these Indians, who seemed much heated at play. I

[36] Histoire de la Nouvelle France par Marc Lescarbot, Nouvelle Edition, Paris 1866, Vol. III, p. 754.

[37] Histoire du Canada, etc., par Gabriel Sagard Theodat; Nouvelle Edition, Paris, 1866, Vol. I, pp. 243-244.

[38] p. 50.

[39] Mœurs des Sauvages Ameriquains, etc., par le P. Lafitau, Paris, 1724, Vol. II, p. 339.

[40] Vol. III, pp. 260-1.

approached them and found that the game they were playing at was what they called the game of platter. This is the game to which the Indians are addicted above all others. They sometimes lose their rest and in some degree their very senses at it. They stake all they are worth, and several of them have been known to continue at it till they have stript themselves stark naked and lost all their movables in their cabin. Some have been known to stake their liberty for a certain time. This circumstance proves beyond all doubt how passionately fond they are of it, there being no people in the world more jealous of their liberty than our Indians."

In the description which Charlevoix then gives, he has relied partly upon personal observations and also to some extent, upon accounts which were at that time in manuscript in Quebec and which were easily accessible to him. He was himself an intelligent observer and a cultivated man. His history and his letters, although not free from the looseness of expression which pervades contemporaneous accounts show on the whole the discipline of an educated mind. We learn from him and from the authorities heretofore enumerated that two players only from each side could participate in this game at any given time during its progress. The necessary implements were a bowl and a number of dice fashioned somewhat like apricot seeds, and colored differently upon the upper and lower sides. Generally, one side was white and the other black. The number of these dice was generally six. There was no fixed rule as to the materials of which they were made; sometimes they were of bone; sometimes the stones of fruits were used. The important point was that the centre of gravity of each die should be so placed, that when it was thrown into the air, or when the bowl in which it was placed, was vio-

lently twirled, there would be an even chance as to which of its two sides the die would settle upon when it lodged; and in the game as it was played in early times that the whole number of dice used should be uniform in the coloring of the sides, each die having the different sides of different colors. The dice were placed in the bowl which was generally of wood, between the two players who were to cast them in behalf of their respective sides. These casters or throwers were selected by each side and the prevailing motives in their choice were generally based upon some superstitious belief in their luck. Perhaps this one had dreamed that he would win. Perhaps that one was believed to possess some magic power, or some secret ointment which when applied to the dice would cause them to turn up favorably for his side.[41] The spectators were generally arranged in seats along the sides of the cabin[42], placed in tiers so that each person could have a view of the players. They were in more senses than one deeply interested in the game. When the cast was to be made the player would strike the bowl upon the ground so as to make the dice jump into the air[43] and would then twirl the bowl rapidly around. During this process and until it stopped its revolutions and the dice finally settled, the players addressed the dice and beat themselves on their breasts.[44] The spectators during the same period filled the air with shouts and invoked aid from their own protecting powers, while in the same breath they poured forth imprecations on those of their adversaries. The number of points affected the length of the game and was entirely optional. If six dice were used

[41] Relations des Jesuites, Relation en l'Annee, 1636, p. 113.
[42] Ibid, Relation en l'Annee, 1639, p. 95.
[43] Sagard Theodat, Vol. I, p. 243.
[44] Shea's Hennepin, p. 309.

and all came up of the same color, the throw counted five.[45] If five of them were of the same color it counted one. Any lower number failed to count. If the caster was unsuccessful he gave place to another, but so long as he continued to win his side would retain him in that position.[46]

The game was often ushered in with singing. Like lacrosse it was prescribed as a remedy for sickness or in consequence of dreams, and the sufferer in whose behalf the game was played was borne to the cabin in which it was to take place. Preliminary fasting and continence were observed, and every effort made that superstition could suggest to discover who would be the lucky thrower and who could aid the caster by his presence at the contest. Old men, unable to walk thither, were brought up on the shoulders of the young men that their presence might be propitious to the chances of the game.[47] The excitement which attended one of these games of chance was intense, especially when the game reached a critical point and some particular throw was likely to terminate it. Charlevoix says the games often lasted for five or six days[48] and oftentimes the spectators concerned in the game, "are in such an agitation as to be transported out of themselves to such a degree that they quarrel and fight, which never happens to the Hurons, except on these occasions or when they are drunk."

Perhaps rum was responsible also for these quarrels; for in the early accounts we are told that losses were philosophically accepted. Father Brebeuf tells of a party

[45] Among the Delawares it required eight counts of five to win. History of the Mission of the United Brethren among the Indians, etc., G. H. Loskiel. Translated by C. I. Latrobe. Part I. Ch. VIII, p. 106.

[46] Charlevoix, Vol. III, p. 261. [47] Ibid, p. 262.

[47] Loskiel (p. 106) saw a game between two Iroquois towns which lasted eight days. Sacrifices for luck were offered by the sides each night.

who had lost their leggings at one of these games and who returned to their village in three feet of snow as cheerful in appearance as if they had won. There seems to have been no limit to which they would not go in their stakes while under the excitement of the game. Clothing, wife, family and sometimes the personal liberty of the player himself rested in the hazard of the die.[49]

The women often played the game by themselves, though apparently with less formality than characterized the great matches. The latter frequently assumed the same local characteristics that we have seen in the game of lacrosse, and we hear of village being pitted against village as a frequent feature of the game.[50]

Morgan[51] describes a game played by the Iroquois with buttons or dice made of elk-horn, rounded and polished and blackened on one side. The players spread a blanket on the ground; and the dice were tossed with the hand in the air and permitted to fall on the blanket. The counts were determined as in the game of platter by the color of the sides of the dice which were exposed when they settled. The number of the dice was eight.

In Perrot's[52] description of the game of platter he alludes to a game, played with eight dice, on a blanket in precisely this way, but he adds that it was practised by women and girls. La Potherie[53] says that the women sometimes play at platter, but ordinarily they cast the fruit stones with the hand as one throws dice.

Under the name of "hubbub" this game has also been

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[49] Charlevoix, Vol. III, p. 251. Le Grand Voyage du Pays des Hurons, par Gabriel Sagard Theodat, Paris, 1632, Nouvelle Edition, Paris, 1865, p. 85; Relations de Jesuites, Relation de la Nouvelle France, en l'Année 1639, pp. 95-96; Lafitau, Vol. II, p. 341.

[50] Perrot, p. 13; Histoire du Canada, par F. X. Garneau, Vol. I, p. 115.

[51] League of the Iroquois, p. 302. [52] Perrot, p. 50. [53] La Potherie, Vol. III, p. 23.

described by observers among the Abenakis. Ogilby[54] says: "Hubbub is five small Bones in a small Tray; the Bones be like a Die, but something flatter, black on the one side and white on the other, which they place on the Ground, against which violently thumping the Platter, the Bones mount, changing Colour with the windy whisking of their Hands to and fro; which action in that sport they much use, smiting themselves on the Breasts and Thighs, crying out Hub Hub Hub; they may be heard playing at this game a quarter of a mile off. The Bones being all black or white make a double Game: if three of one colour, and two of another, then they afford but a single game; four of a colour and one differing is nothing. So long as the Man wins he keeps the Tray, but if he lose the next Man takes it."

There is but little said about this game in the south by writers. It evidently had no such hold there as among the Hurons and the tribes along the Lakes. Lawson[55] saw it played in North Carolina with persimmon stones as dice. While this fixes the fact that the game had a home among the southern Indians, the way in which it has been slighted by the majority of writers who treat of that section shows that it was not a favorite game there.

To what shall we ascribe this? Its hold upon the northern Indians shows that it was peculiarly adapted to the temperament of the natives, and we should naturally expect to find it as much in use among the tribes of the south as with those of the north. An explanation for this may possibly be found in the difference of the climate. The game was especially adapted for the winter, and while its practice was evidently not exclusively con-

[54] America, being an Accurate Description of the New World, etc. Collected and Translated by John Ogilby. London, 1670. Book II. Ch. II, p. 155.

[55] History of North Carolina by John Lawson, London, 1718, p. 176.

fined to that season, it is possible that its greater hold upon the affections of the Indians of the north arose from their being obliged to resort to in-door amusements during the protracted winters in that region. From this necessity the southern Indians being in a measure exempt, they continued their out-door games as usual and never became so thoroughly infatuated with this game.

Informal contests were often held between players, in which the use of the bowl or platter was dispensed with. The dice were held in the hand and then tossed in the air. They were allowed to fall upon some prepared surface, generally a deerskin spread for the purpose. The same rules as to the color of the surfaces of the dice when they settled in their places governed the count. This form of the game is sometimes described as a separate game. Boucher[56] calls it *Paquessen*.[57] The women of Oregon played it with marked beaver teeth.[58] Among the Twanas it was played with beaver or muskrat teeth.[59] Powers[60] says that among the Nishinams, a tribe living on the slopes of the Sierra Nevada between the Yuba and Cosumnes rivers, "a game of dice is played by men or women, two, three or four together. The dice, four in number, consist of two acorns split lengthwise into halves, with the outsides scraped and painted red or black. They are shaken in the hand and thrown into a wide flat basket, woven in ornamental patterns. One paint and three whites, or

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[56] True and Genuine Description of New France, etc., by Pierre Boucher, Paris, 1641. Translated under title "Canada in the Seventeenth Century," Montreal, 1883, p. 57.

[57] Played by women and girls. Sagard Theodat. Histoire du Canada. Vol. I, p. 244.

[58] Contributions to North American Ethnology, Vol. I, p. 206, George Gibbs; H. H. Bancroft's Native Races, Vol. I, p. 244; The Northwest Coast by James G. Swan, p. 158.

[59] Bulletin, U. S. Geological Survey, Vol. III, No. 1, April 5, 1877. Rev. M. Eells.

[60] Contributions to North American Ethnology, Vol. III, p. 332.

vice versa, score nothing; two of each score one; four alike score four. The thrower keeps on throwing until he makes a blank throw, when another takes the dice. When all the players have stood their turn, the one who has scored the most takes the stakes."

The women of the Yokuts,[61] a Californian tribe which lived in the San Joaquin valley near Tulare Lake, had a similar game. Each die was half a large acorn or walnut shell filled with pitch and powdered charcoal and inlaid with bits of bright colored abaloni shell. Four squaws played and a fifth kept tally with fifteen sticks. There were eight dice and they scooped them up with their hands and dashed them into the basket, counting one when two or five flat surfaces turned up.

Schoolcraft[62] says "one of the principal amusements of a sedentary character is that of various games, success in which depends on luck in numbers. These games, to which both the prairie and forest tribes are addicted, assume the fascination and intensity of gambling; and the most valued articles are often staked upon the luck of a throw. For this purpose the prairie tribes commonly use the stones of the wild plum or some analogous fruit, upon which various devices indicating their arithmetical value are burned in, or engraved and colored, so as at a glance to reveal the character of the pieces." Among the Dacota tribes this is known by a term which is translated the "game of plum stones." He gives illustrations of the devices on five sets of stones, numbering eight each. "To play this game a little orifice is made in the ground and a skin put in it; often it is also played on a robe."[63] The women and the young men play this game. The bowl is lifted with one

[61] Contributions to North American Ethnology, Vol. III, p. 377.

[62] Schoolcraft's Indian Tribes, Vol. II, pp. 71, 72.

[63] Domenech, Vol. II, p. 191; First Annual Report of Bureau of Ethnology, Smithsonian, 1881, p. 165.

hand and rudely pushed down to its place. The plum stones fly over several times. The stake is first put up by all who wish to play. A dozen can play at once if desirable.

Schoolcraft[64] describes still another form of the game which he found among the Chippewas, in which thirteen pieces or dice were used. Nine of them were of bone and were fashioned in figures typifying fish, serpents, etc. One side of each was painted red and had dots burned in with a hot iron. The brass pieces were circular having one side convex and the other concave. The convex side was bright, the concave dark or dull. The red pieces were the winning pieces and each had an arithmetical value. Any number of players might play. A wooden bowl, curiously carved and ornamented, was used. This form of the game may have been modified by contact with the whites. It seems to be the most complex[65] form in which the game appears. The fact still remains however, that in some form or other we find the game in use across the entire breadth of the continent.[66]

STRAW OR INDIAN CARDS.

The third game mentioned by Father Brebeuf was that which was called straw. We have seen that the first of these games called for strength, agility and endurance. It was as free from elements of chance as any human contest

[64] Vol. II, p. 72.

[65] See also a simpler form of the game described by Philander Prescott among the Dacotas.—Schoolcraft, Vol. IV, p. 64. The tendency of the modern Indians to elaborate the game may be traced in the description of "Plumstone shooting" given in "Omaha Sociology" by Rev. J. Owen Dorsey. Third Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution. Washington, 1884, p. 355.

[66] Col. James Smith describes the game among the Wyandots. An Account of the Remarkable Occurrences in the Life and Travels of Col. James Smith, during his Captivity with the Indians in the Years 1755-1759. Cincinnati, 1870, p. 16. Tanner also describes it. He calls it *Bag-ga-sah* or dice. Tanner's Narrative. New York, 1830, p. 114.

can be. The victory belonged to the side which counted amongst its numbers those players who were the fleetest runners, the most skilful throwers and the most adroit dodgers. The second was purely a game of chance. If honestly played no other element entered into its composition. The third which we are now about to consider was much more complicated in its rules than either of the others. It closely resembled in some respects several of our modern gambling games. The French found it very difficult to comprehend and hence the accounts of it which they have given are often confused and perplexing. Boucher[67] says, "Our French people have not yet been able to learn to play it well: it is full of spirit and these straws are to the Indians what cards are to us." Lafitau[68] after quoting from Boucher says, "Baron de la Hontan also made out of it a game purely of the mind and of calculation, in which he who best knows how to add and subtract, to multiply and divide with these straws will surely win. To do this, use and practice are necessary, for these savages are nothing less than good calculators."

"Sieur Perrot, who was a celebrated traveller, and that European whom the savages of New France have most honored, left a description of this game in his manuscript Memorial. I would gladly have inserted it here but it is so obscure that it is nearly unintelligible." Charlevoix admits that he could understand nothing of the game, except as played by two persons in its simplest form and adds that he was told that "there was as much of art as of chance in the game and that the Indians are great cheats at it."[69]

[67] p. 57. [68] Vol. II, p. 351.

[69] Charlevoix, Vol. III, p. 319; Father Tailhan who edited Perrot says he has not been any more successful than his predecessors and the game of straws remains to him an unsolved enigma. Perrot, Notes to Ch. X, p. 188.

Where Lafitau and Charlevoix, aided by opportunities to investigate the game itself, have failed, it would seem to be useless for us to attempt. Perrot has indeed succeeded in making his account hopelessly involved. There is however much information to be derived from it and the obscure points are after all unimportant unless one should actually wish to reproduce the game in practice. In that event there are many points connected with the counts which would prove troublesome.

To play the game, a number of straws or reeds uniform in size and of equal length were required. They were generally from six to ten inches long. The number used in the game was arbitrary. Lawson puts it at fifty-one. Charlevoix at two hundred and one. The only essential points were that the numbers should be odd and that there should be enough of them so that when the pile was divided into two parts, a glance would not reveal which of the two divisions contained the odd number of straws. In its simplest form, the game consisted, in separating the heap of straws into two parts, one of which each player took, and he whose pile contained the odd number of straws was the winner. Before the division was made the straws were subjected to a manipulation, somewhat after the manner of shuffling cards. They were then placed upon the deer-skin or upon whatever other article was selected as a surface on which to play. The player who was to make the division into two heaps, with many contortions of the body and throwing about of the arms, and with constant utterances to propitiate his good luck, would make a division of the straws with a pointed bone or some similar instrument, himself taking one of the divisions while his adversary took the other. They would then rapidly separate the straws into parcels numbering ten each and determine from the fractional remainders, who had the odd number.

The speed with which this process of counting was carried on was always a source of wonder to the lookers-on, and the fact that the counting was done by tens is almost invariably mentioned. Between two people betting simply on the odd number no further rules were necessary. To determine which had the heap containing the odd number, there was no need to foot up the total number of tens. It was to be settled by what was left over after the last pile of complete tens was set aside. The number itself might be either one, three, five, seven or nine. In the more complicated form of the game, this led to giving different values to these numbers, the nine being always supreme and the one on which the highest bets were wagered. It was generally understood that the holder of this number swept the board taking all bets on other numbers as well as those on the nine. It was easy to bet beads against beads and skins against skins, in a simple game of odd or even, but when the element of different values for different combinations was introduced, some medium of exchange was needed to relieve the complications. Stones of fruit were employed just as chips or counters are used in modern gambling games, and a regular bank was practically instituted. Each player took a certain number of these counters, as the equivalent of the value of the merchandise which he proposed to hazard on the game, whether it was a gun, a blanket, or some other article. Here we have all the machinery of a regular gambling game at cards, but the resemblance does not stop here. The players put up their bets precisely as they now do in a game of faro, selecting their favorite number and fixing the amount, measured in the standard of the game, which they wished to hazard. "By the side of the straws which are on the ground are found the (*grains*) counters," says Perrot, "which the players have bet on the game." In another place, the

method of indicating the bets is stated as follows: "he (meaning apparently the one who has bet) is also obliged to make two other heaps. In one he will place five, in the other seven straws, with as many (*grains*) counters as he pleases." These phrases may fairly be interpreted to mean that a record of the bets, somewhat of the same style as that kept with counters upon a faro table, was constantly before the players. Complicated rules determined when the players won or lost; when the bets were to be doubled and when they were to abide the chance of another count. The loser at the game, even after all that he had with him was gone, was sometimes permitted to continue the game on his promise to pay. If ill luck still pursued him the winner could refuse him credit and decline to play for stakes that he could not see.

The game often lasted for several days, one after another of the sides relieving his comrades at the play until one of the two sides had lost everything, it being, says Perrot,[79] "a maxim of the savages not to quit play until one side or the other had lost everything." Those who had bet at the game had the right to substitute any person whom they pleased to play for them. "Should any dispute arise on this point," says Perrot, "between the winners and the losers, the disputants backed by their respective sides would probably come to blows, blood would be shed and the whole thing would be very difficult to settle." Cheating often took place at this game. Its exposure was considered praiseworthy and its practice denounced. If doubts were expressed as to the accuracy of a count, the matter was peacefully adjusted by a re-count by two of the spectators.

"This game of straw," says Perrot, from whose ac-

[79] p. 49.

count we have made the foregoing digest, "is ordinarily held in the cabins of the chiefs, which are large, and are, so to speak, the Academy of the Savages." He concludes his account with the statement that the women never play it.[71] The authority on this game whom Ogilby quotes slides over the difficulties of the description with the statement that "many other whimsies be in this game which would be too long to commit to paper." Abbé Ferland[72] epitomizes the results of his investigation of this game as follows: "Memory, calculation and quickness of eye-sight were necessary for success."

Like the game of dice or platter it was essentially a house game, and like platter it is rarely mentioned by writers who describe the habits of Indians in the south. Lawson describes it, but in slightly modified form, as follows: "Indian Cards. Their chiefest game is a sort of Arithmetick, which is managed by a parcel of small split reeds, the thickness of a small Bent; these are made very nicely, so that they part, and are tractable in their hands. They are fifty-one in number, their length about seven inches; when they play, they throw part of them to their antagonist; the art is, to discover, upon sight, how many you have, and what you throw to him that plays with you. Some are so expert at their numbers, that they will tell ten times together, what they throw out of their hands. Although the whole play is carried on with the quickest motion it is possible to use, yet some are so expert at this Game, as to win great Indian Estates by this Play. A good sett of these reeds, fit to play withal are valued and sold for a dressed doe-skin."

A. W. Chase[73] speaks of "native games of cards

[71] See also Shea's Hennepin, p. 300. [72] Vol. I, p. 134.

[73] Overland Monthly, Vol. II, p. 433. Dorsey found a survival of the game in use among the Omahas. He called it "stick counting." Third Annual Report, Bureau of Ethnology, p. 358.

among the Coquelles and Makneatanas, the pasteboards being bundles of sticks." He furnishes no description of the games, but uses the same phrase which was applied by Lawson in North Carolina and by Boucher in Canada.

Frank H. Cushing[74] speaks of a game of "Cane-cards" among the Zuñi which he says "would grace the most civilized society with a refined source of amusement." He was not able fully to comprehend it.

In the list of games, there is none of which we have any detailed account, which compares with straws as played by the northern tribes, in elaborateness of construction. The unfortunate confusion which prevails throughout Perrot's description of the method of counting, and the way in which the point was shirked by all other writers on the subject, prevents any attempt at analysis. So far as we can see, the rules were arbitrary and not based upon any calculations of the laws of chance. If some other detailed account of the game should be discovered it would be interesting to follow up this question and ascertain how far the different combinations which affected the counts were based upon a theory of probabilities and how far they were arbitrary.

It will of course be noticed that the game described by Lawson was relieved from much of this complication. The dexterity required to make a throw of such a nature that the player could tell exactly the number of reeds with which he had parted, was of course remarkable and naturally called forth expressions of surprise. But there were apparently no other combinations resting upon the throw than the simple guess at the number thrown. Travellers in California have described the game in still simpler form in which we see hints of the more complex

[74] The Century, Vol. XXVI, p. 28. My Adventures in Zuñi.

game. Here the "sticks" were thrown in the air and an immediate guess was made whether the number thrown was odd or even. An umpire kept the account with other sticks and on this count the bets were adjusted.[75]

Wherever we find it and whatever the form in use, whether simple or complicated, like games of lacrosse and platter the occasion of its play was but an excuse for indulgence in the inveterate spirit of gambling which everywhere prevailed.

CHUNKEE OR HOOP AND POLE.

Among the Indians at the south, observers noted and described a game of great antiquity, of which we have no record during historical times among those of the north, unless we should classify the game of javelin described by Morgan[76] as a modified form of the same game. The general name by which this game was known was chunkee. When Iberville arrived at the mouth of the Mississippi he despatched a party to explore the river. The officer who kept the "Journal de la frégate, le Marin" was one of that party and he recorded the fact that the Bayagoulas and Mougoulachas passed the greater part of their time in playing in this place with great sticks which they throw after a little stone, which is nearly round and like a bullet.[77] Father Gravier descended the river in 1700 and at the village of Houmas he saw a "fine level square where from morning to night there are young men who exercise

[75] Kotzebue, A Voyage of Discovery, etc. London, 1821. Vol. I, p. 282 and Vol. III, p. 44, note. W. H. Emory, U. S. and Mexican Boundary Survey, Vol. I, p. 111, says: "The Yumas played a game with sticks like jackstraws." Stanley, Smithsonian Miscellaneous Collections, Vol. II, p. 55, gives among his "Portraits of North American Indians," a picture of a game which he describes as "played exclusively by women. They hold in their hands twelve sticks about six inches in length which they drop upon a rock. The sticks that fall across each other are counted for game."

[76] League of the Iroquois, p. 300. [77] Margry, Decouvertes, etc., Vol. 4, p. 261.

themselves in running after a flat stone which they throw in the air from one end of the square to the other, and which they try to have fall on two cylinders that they roll where they think the stone will fall."[78] Adair gives the following description of the same game: "The warriors have another favorite game, called '*chungke*', which, with propriety of language may be called 'Running hard labour.' They have near their state house[79] a square piece of ground well cleaned, and fine sand is carefully strewed over it, when requisite, to promote a swifter motion to what they throw along the surface. Only one or two on a side play at this ancient game. They have a stone about two fingers broad at the edge and two spans round; each party has a pole of about eight feet long, smooth, and tapering at each end, the points flat. They set off abreast of each other at six yards from the end of the playground; then one of them hurls the stone on its edge, in as direct a line as he can, a considerable distance toward the middle of the other end of the square. When they have run a few yards, each darts his pole anointed with bears' oil, with a proper force, as near as he can guess in proportion to the motion of the stone, that the end may lie close to the stone. When this is the case, the person counts two of the game, and, in proportion to the nearness of the poles to the mark, one is counted, unless by measuring, both are found to be at an equal distance from the stone. In this manner, the players will keep running most part of the day, at half speed, under the violent heat of the sun, staking their silver ornaments, their nose-, finger- and ear-rings; their breast-, arm- and wrist-plates, and even all their wearing apparel, except that which barely covers their middle. All the

[78] Shea's Early Voyages, Albany, 1861, p. 143.

[79] Consult E. G. Squier.—Aboriginal Monuments of N. Y., Smithsonian Contributions to Knowledge, Vol. II, pp. 135-6 and note p. 136.

American Indians are much addicted to this game, which to us appears to be a task of stupid drudgery; it seems, however, to be of early origin, when their forefathers used diversions as simple as their manners. The hurling stones they use at present were from time immemorial rubbed smooth on the rocks and with prodigious labor; and they are kept with the strictest religious care, from one generation to another, and are exempted from being buried with the dead. They belong to the town where they are used, and are carefully preserved."[80]

Lieut. Timberlake[81] describes the game as he saw it played among the Cherokees where it was known by the name of "Nettecawaw." "Each player has a pole about ten feet long, with several marks or divisions. One of them bowls a round stone with one flat side, and the other convex, on which the players all dart their poles after it, and the nearest counts according to the vicinity of the bowl to the marks on his pole."

Romans saw it among the Choctaws. He says, "The manner of playing the game is thus: they make an alley of about two hundred feet in length, where a very smooth clayey ground is laid, which when dry is very hard: they play two together having each a straight pole about fifteen feet long; one holds a stone which is in the shape of a truck, which he throws before him over this alley, and the instant of its departure, they set off and run; in running they cast their poles after the stone; he that did not throw it endeavors to hit it; the other strives to strike the pole of his antagonist in its flight so as to prevent the pole of his opponent hitting the stone. If the first should strike the stone he counts one for it, and if the other by the

[80] See also Historical Collections, Louisiana and Florida. B. F. French (Vol. II., second series, p. 74. New York, 1875.

[81] Memoirs of Lieut. Henry Timberlake, etc., London, 1765, p. 77.

dexterity of his cast should prevent the pole of his opponent hitting the stone, he counts one, but should both miss their aim the throw is renewed."

Le Page du Pratz[82] describes the game as practised among the Natchez. He calls it "*Le Jeu de la Perche* which would be better named *de la crosse*." Dumont who was stationed at Natchez and also on the Yazoo, describes the game and speaks of it as "La Crosse."[83]

Adair is correct when he speaks of the antiquity of this game. When he dwells upon the fact that these stones are handed down from generation to generation, as the property of the village, he brings these tribes close to the mound dwellers. Squier,[84] speaking of discoidal stones, found in the mounds, says, "It is known that among the Indian tribes of the Ohio and along the Gulf, such stones were in common use in certain favorite games." Lucien Carr[85] describes and pictures a chunkee stone from Ely Mound, Va. Lewis and Clarke[86] describe the game as played among the Mandans. This tribe had a wooden platform prepared on the ground between two of their lodges. Along this platform the stone ring was rolled and the sticks were slid along the floor in pursuit of it. Catlin[87] describes the game as played by the same tribe. They had a carefully prepared pavement of clay on which they played. The "Tchunkee" sticks were marked with bits of leather and the counts of the game were affected by the position of the leather on or near which the ring lodged.

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[82] Histoire de la Louisiane, Paris, 1758. Vol. III, p. 2.

[83] Memoires Historiques sur la Louisiane, Paris, 1753, Vol. I, p. 202.

[84] Ancient Monuments of the Mississippi Valley, p. 223.

[85] 16th Annual Report Peabody Museum, p. 93. See also Schoolcraft's Indian tribes, Vol. I, p. 83.

[86] Lewis and Clarke's Expedition, Phila., 1814. Vol. I, p. 143.

[87] Vol. I, p. 132 *et seq.* Dorsey describes two forms of the game in use among the Omahas: "shooting at the rolling wheel" and "stick and ring." Third Annual Report, Bureau of Ethnology, pp. 335-336. *Cf.* Travels in the Interior of America in the years 1809, 1810 and 1811, by John Bradbury, p. 126.

The Mojaves are accustomed to play a similar game which has been described under the name "Hoop and Pole".[88] A similar game was played by the Navajoes.[89]

The Yumas played a game with two poles fifteen feet long and a ring a few inches in diameter.[90] Kane[91] says that the Chualpays at Fort Colville on the Columbia "have a game which they call '*Alkollock*,' which requires considerable skill. A smooth, level piece of ground is chosen, and a slight barrier of a couple of sticks placed lengthwise is laid at each end of the chosen spot, being from forty to fifty feet apart and only a few inches high. The two players, stripped naked, are armed with a very slight spear, about three feet long, and finely pointed with bone; one of them takes a ring made of bone or some heavy wood and wound with cord. The ring is about three inches in diameter, on the inner circumference of which are fastened six beads of different colors, at equal distances, to each of which a separate value is attached. The ring is then rolled along the ground to one of the barriers and is followed at the distance of two or three yards by the players, and as the ring strikes the barrier and is falling on its side, the spears are thrown, so that the ring may fall on them. If any one of the spears should be covered by the ring, the owner counts according to the colored bead on it. But it generally happens from the dexterity of the players that the ring covers both spears and each counts according to the color of the beads above his spear. They then play towards the other

[88] Lieut. A. W. Whipple in Pac. R. R. Rep., Vol. III, p. 111; Harper's Mag., Vol. XVII, p. 163; Domenech, Vol. II, p. 137; H. H. Bancroft's Native Races, Vol. I, p. 393, p. 547 and note 153. The Martial Experiences of the California Volunteers by Edward Carleton, Overland, Vol. VII, No. II, 2nd series, p. 131.

[89] Major E. A. Backus in Schoolcraft, Vol. IV, p. 211.

[90] W. H. Emory, U. S. and Mexican Boundary Survey, Vol. I, p. 111.

[91] Kane's Wanderings, p. 310; H. H. Bancroft's Native Races, Vol. I, p. 280.

barrier, and so on until one party has obtained the number agreed upon for the game."

In his "Life among the Apaches,"[92] Colonel Cremony describes the hoop and pole game as played by the Apaches. With them the pole is marked with divisions throughout its whole length and these divisions are stained different colors. The object of the game is to make the hoop fall upon the pole as near the butt as possible, graduated values being applied to the different divisions of the pole. The women are not permitted to approach within a hundred yards while the game is going on.[93]

Those who have described this game in the various forms in which it has been presented dwell upon the fact that it taxed the strength, activity and skill of the players. In this respect it rivalled lacrosse. In geographical range the territory in which it was domesticated was nearly the same.

There are many, doubtless, who would decline to recognize the discoidal stones of the mounds as chunkee stones, but it can not be denied that the "*nettecawaw*" of the Cherokees[94], the "hoop and pole" of the Mojaves and Apaches[95], the second form of "spear and ring" described by Domenech,[96] the "*alkollock*" of the Chualpays[97] and the chunkee of Romans and Adair are the same game.

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[92] Life among the Apaches, by John C. Cremony, p. 302.

[93] The Hawaiians were accustomed to hurl a piece of hard lava along narrow trenches prepared for the purpose. The stone which was called Maika closely resembled a chunkee stone. It is described as being in the shape of a small wheel or roller, three inches in diameter and an inch and a half thick, very smooth and highly polished. This game appears to have been limited to a contest of skill in rolling or hurling the stone itself. The additional interest which was given by hurling the spears at it while in motion was wanting. Narrative of the U. S. Exploring Expedition by Charles Wilkes, London, 1845, Vol. IV, p. 55.

[94] Timberlake, p. 77.

[95] Whipple, Pac. R. R. Rep., Vol. III, p. 114; Cremony, p. 302; Harper's Mag., Vol. XVII, p. 163.

[96] Domenech, Vol. II, p. 197. [97] Kane's Wanderings, p. 310.

The change from the discoidal stone to the ring; the different materials of which the ring is made, whether of stone,[98] of bone,[99] of wood,[100] or of cord;[101] whether wound with cord[102] or plain; the different lengths of the spears varying from three feet[103] to ten feet[104] and even reaching fifteen feet in length among the Mojaves;[105] the different markings of the spear[106] and the ring;[107] the different ways of preparing the ground, whether tamping with clay,[108] or flooring with timber,[109] or simply removing the vegetation,[110] — all these minor differences are of little consequence. The striking fact remains that this great number of tribes, so widely separated, all played a game in which the principal requirements were, that a small circular disk should be rolled rapidly along a prepared surface and that prepared wooden implements, similar to spears, should be launched at the disk while in motion or just at the time when it stopped. Like lacrosse, it was made use of as an opportunity for gambling, but owing to the restriction of the ground on which it could be played, the number of players were limited, and to that extent the interest in the contests and the excitement attendant upon them were proportionally reduced.

OTHER ATHLETIC GAMES.

In addition to the games of lacrosse, platter or dice, straws and chunkee, there were other games, some of an athletic nature, some purely of chance, which observers have described, some of which are mentioned only in

[98] Lewis and Clarke, Vol. I, p. 113; Catlin, Vol. I, p. 132.
[99] Kane's Wanderings, p. 310. [100] Cremony, p. 302.
[101] Whipple, Pac. R. R. Rep., Vol. III, p. 114. [102] Kane's Wanderings, p. 310.
[103] Ibid. [104] Timberlake, p. 77; Cremony, p. 302.
[105] Whipple, Pac. R. R. Rep., Vol. III, p. 114.
[106] Cremony, p. 302; Domenech, Vol. II, p. 197; Timberlake, p. 77.
[107] Kane's Wanderings, p. 310. [108] Catlin, Vol. I, p. 132.
[109] Lewis and Clarke, Vol. I, p. 113. [110] Domenech, Vol. II, p. 197.

limited areas, while others, like the games above mentioned, were played by Indians scattered over a wide territory and apparently having but little in common. Some of these games were but modified forms of those which have been already described. Such, for instance, is a game of ball which is described by Lafitau[111] and by Charlevoix.[112] This closely resembled lacrosse in its general methods of play, but as no rackets were used, it was less dangerous and less exciting. Goals were erected at each end of the field, separated by five hundred paces according to Lafitau. The players were divided into sides. The ball was tossed into the air in the centre of the field. When it came down the players of each side strove to catch it. He who was successful ran in the direction of the goal which he wished to reach. The players of the opposide side pursued him and did what they could to prevent him from accomplishing his object. When it was evident that the runner could gain no more ground, he would pass the ball, if possible, to some player upon the same side and his success in accomplishing this was dependent largely upon his skill. The game is probably not so old as lacrosse, for the ball is described as being larger and softer than the one used in lacrosse, thus indicating that it belonged to the period when the stuffed deer-skin ball was used in that game.

Both Dumont and Le Page du Pratz describe this game with this difference,[113] that the ball, according to their descriptions, was incessantly tossed in the air. Romans says that this game was played among the women; and Lafitau, who describes it separately, adds that in this form it was only played by girls. He also says that the Abenakis indulged in a similar game, using an inflated bladder

[111] Lafitau, Vol. II, p. 353. [112] Charlevoix, Vol. III, p. 380.
[113] Dumont, Vol. I, p. 201; Le Page, Vol. I, p. 378.

for a ball; and that the Florida Indians fixed a willow cage upon a pole in such a way that it could revolve and tried to hit it with a ball so as to make it turn several times.[114]

Joutel in his historical journal describes a curious game as follows: "Taking a short stick, very smooth and greased that it may be the harder to hold it fast, one of the elders throws it as far as he can. The young men run after it, snatch it from each other, and at last, he who remains possessed of it has the first lot."[115]

Foot ball is found at the north. Ogilby[116] says: "Their goals are a mile long placed on the sands, which are as even as a board: their ball is no bigger than a hand ball, which sometimes they mount in the air with their naked feet, sometimes it is swayed by the multitude, sometimes also it is two days before they get a goal, then they mark the ground they win, and begin there the next day. Before they come to this sport they paint themselves, even as when they go to war." At the south it was "likewise a favorite manly diversion with them."[117]

Certain forms of ball-play which were neither lacrosse nor chunkee, but which resembled these games were found in different localities. Such for instance is the game which Catlin[118] saw played by the Sioux women. Two balls were connected with a string a foot and a half long. Each woman was armed with a stick. They were divided into equal sides. Goals were erected and the play was in some respects like lacrosse. Stakes were wagered on the game. This game is also described by Domenech,[119] who says the women wore a special costume which left the limbs free and that

[114] Lafitau, Vol. II, p. 358.

[115] French's Historical Collections of Louisiana, Vol. I, p. 188; Sanford's History of the United States before the Revolution, p. clxxxii.

[116] Ogilby, Book II, Chap. II, p. 156. See also Smith's Narrative, p. 77.

[117] Bartram, p. 509. [118] Vol. II, p. 196. [119] Vol. II, p. 196.

the game was "unbecoming and indecent." Powers[120] found a game among the Nishinams, on the western slope of the Sierra Nevada, not far from Sacramento, which in some respects also resembled lacrosse. He says "The *'Ti'-kel'* is the only really robust and athletic game they use, and is played by a large company of men and boys. The piece[121] is made of raw-hide or nowadays of strong cloth, and is shaped like a small dumb-bell. It is laid in the centre of a wide, level space of ground, in a furrow, hollowed out a few inches in depth. Two parallel lines are drawn equidistant from it, a few paces apart, and along these lines the opposing parties, equal in strength, range themselves. Each player is equipped with a slight, strong staff, from four to six feet long. The two champions of the party take their stations on opposite sides of the piece, which is thrown into the air, caught on the staff of one of the others, and hurled by him in the direction of his antagonist's goal. With this send-off there ensues a wild chase and a hustle, pell-mell, higgledy-piggledy, each party striving to bowl the piece over the other's goal. These goals are several hundred yards apart.

In an article in the Overland Monthly, [122] A. W. Chase describes a game in vogue among the Oregon Indians which he says was identical with hockey, as follows: "Sides being chosen, each endeavors to drive a hard ball of pine wood around a stake and in different directions; stripped to the buff, they display great activity and strength, whacking away at each other's shins, if they are in the way, with a refreshing disregard of bruises. The squaws assist in the performance by beating drums and keeping up a monotonous chant."

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[120] Contributions to North American Ethnology. Vol. III, p. 333.
[121] The equivalent in the game, of the ball in lacrosse.
[122] Vol. II, p. 433. See also Smith's Narrative, p. 77

In the first of the two games of "spear and ring," described by Domenech,[123] the players are divided into sides. The stone ring, about three inches in diameter, is fixed upright on the chosen ground, and players two at a time, one from each side, endeavor to throw their spears through the ring. The spears are marked along their length with little shields or bits of leather, and the count is affected by the number of these that pass through the ring. He also mentions a game[124] among the Natchez in which the ring was a "huge stone" and the spear a "stick of the shape of a bat."

If we classify Domenech's first game of "spear and ring" among those which resemble chunkee, rather than as a form of chunkee itself, we shall probably be compelled to pursue the same course with Morgan's game of "javelin" to which we have already alluded.[125] In this game the players divided into sides. Each player had an agreed number of javelins. The ring, which was either a hoop or made solid like a wheel by winding with splints, was about eight inches in diameter. The players on one side were arranged in a line and the hoop was rolled before them. They hurled their javelins. The count of the game was kept by a forfeiture of javelins. Such as hit the mark were safe, but the javelins which did not hit were passed to the players of the other side who then had an opportunity to throw them at the hoop from the same spot. If these players were successful the javelins were forfeited and laid out of the play. If, however, they in turn failed the javelins were returned to their original owners. The hoop was then rolled by the other side and the process continued until one of the sides had forfeited all their javelins.

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[123] Vol. II., pp. 197-8.

[124] He does not give his authority for this game. He has evidently copied in his book from other writers, but seldom indicates whether his descriptions are based upon personal observation or quoted.

[125] League of the Iroquois, p. 300.

OTHER GAMES OF CHANCE.

There was diversity in the forms of the games of simple chance as well as in the athletic games, and besides those which have been already described, the Indians on the Pacific Coast had a great variety of games, or forms of the same game, in which, in addition to the element of chance involved in determining the numbers or positions of certain sticks or counters, there was also an opportunity for the player who was manipulating them to deceive by dexterous sleight of hand. The simplest form in which this is found is guessing in which hand a small stone or bone is held. It would hardly seem that this artless effort could be transformed into an amusing and exciting game: yet it has attracted the attention of all travellers, and scarcely any writer, who treats of the habits of the Pacific coast Indian, fails to give a full account of this simple game. Lewis and Clarke,[126] when writing about the Indians near the mouth of the Columbia, say: "The games are of two kinds. In the first, one of the company assumes the office of banker and plays against the rest. He takes a small stone, about the size of a bean, which he shifts from one hand to another with great dexterity, repeating at the same time a song adapted to the game and which serves to divert the attention of the company, till having agreed on the stakes, he holds out his hands, and the antagonist wins or loses as he succeeds or fails at guessing in which hand the stone is. After the banker has lost his money or whenever he is tired, the stone is transferred to another, who in turn challenges the rest of the company.[127] In the

[126] Lewis and Clarke, Vol. II, 140; and also II, 94.

[127] See also, Adventures on the Columbia River, by Ross Cox, p. 158; The Oregon Territory, by John Dunn, p. 93; Four Years in British Columbia, by Commander R. C. Mayne, p. 275; it was played by the Comanches in Texas with a bullet, Robert S. Neighbors in Schoolcraft, Vol. II, p. 133; by the Twanas with one or two bones, Bulletin U. S. Geol. Survey, Vol. III, No. 1, p. 89, Rev. M. Eells.

account given by George Gibbs[128] the count of the game among the tribes of western Washington and northwestern Oregon, was kept by means of sticks. Each side took five or ten small sticks, one of which was passed to the winner on each guess, and the game was ended when the pile of one side was exhausted. According to him, "The backers of the party manipulating keep up a constant drumming with sticks on their paddles which lie before them, singing an incantation to attract good fortune." Powers describes another form into which the game developed among the Indians of central California. It is "played with a bit of wood or a pebble which is shaken in the hand, and then the hand closed upon it. The opponent guesses which finger (a thumb is a finger with them) it is under and scores one if he hits, or the other scores if he misses. They keep tally with eight counters."[129]

Schwatka, in his recent exploration of the Yukon found this game among the Chilkats. It was called *la-hell*. Two bones were used. One was the king and one the queen. His packers gambled in guessing at the bones every afternoon and evening after reaching camp.[130]

The simplicity of the game was modified by the introduction of similar articles in each hand, the question to be decided being in which hand one of them having a specified mark should be found. Kane[131] thus describes such a game among the Chinooks: "Their games are few. The one most generally played amongst them consists in holding in each hand a small stick, the thickness of a goose quill, and about an inch and one-half in length, one plain, the other distinguished by a little thread wound round

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[128] Contributions to North American Ethnology, Vol. I, p. 206.
[129] Contributions to North American Ethnology, Vol. III, pp. 332 3.
[130] Along Alaska's Great River. By Frederic Schwatka, p. 71.
[131] Kane's Wanderings, p. 159.

it, the opposite party being required to guess in which hand the marked stick is to be found. A Chinook will play at this simple game for days and nights together, until he has gambled away everything he possesses, even to his wife."[132]

Among the Utahs this form of the game was common: "A row of players consisting of five or six or a dozen men is arranged on either side of the tent facing each other. Before each man is placed a bundle of small twigs or sticks each six or eight inches in length and pointed at one end. Every tête-à-tête couple is provided with two cylindrical bone dice carefully fashioned and highly polished which measure about two inches in length and half an inch in diameter, one being white and the other black, or sometimes ornamented with a black band." At the rear, musicians were seated who during the game beat upon rude drums.[133] In this game it will be noticed that the players paired off and apparently each man played for himself.

Still another element is introduced in another form of the game, which increases the opportunity afforded the one who manipulates the bones for dexterity. This form of the game is repeatedly alluded to by Powers. While relating the habits and customs of the Gualala, whose homes were near Fort Ross, he describes what he calls the gambling game of "*wi* and *tep*" and says that one description with slight variations will answer for nearly all the tribes of central and southern California. After describing the making up of the pool of stakes, he adds: "They gamble with four cylinders of bone about two inches long, two of which are plain, and two marked with rings and strings tied round the middle. The game is conducted by four old and ex-

[132] See also, Overland, Vol. IX, p. 103, Powers; H. H. Bancroft's Native Races, Vol. I, p. 241; Clay balls are sometimes used, Ibid, Vol. I, p. 353; The Northwest Coast, James G. Swan, p. 158, Montanas as it is, Granville Stuart, p. 71.

[133] Edwin R. Barker in the American Naturalist, June, 1877. Vol. XI, p. 351.

perienced men, frequently grey heads, two for each party, squatting on their knees on opposite sides of the fire. They have before them a quantity of fine dry grass, and with their hands in rapid and juggling motions before and behind them, they roll up each piece of bone in a little ball and the opposite party presently guess in which hand is the marked bone. Generally only one guesses at a time, which he does with the word *'tep'* (marked one), and *'ori'* (plain one). If he guesses right for both players, they simply toss the bones over to him and his partner, and nothing is scored on either side. If he guesses right for one and wrong for the other, the one for whom he guessed right is 'out', but his partner rolls up the bones for another trial, and the guesser forfeits to them one of his twelve counters. If he guesses wrong for both, they still keep on and he forfeits two counters. There are only twelve counters and when they have been all won over to one side or the other, the game is ended."[134] Sometimes the same game was played without going through the formality of wrapping the pieces in grass, simply shaking them in the hands as a preliminary for the guessing.[135]

A slightly different method prevails among the Indians of Washington and northwestern Oregon. Ten disks of hard wood, each about the diameter of a Mexican dollar and somewhat thicker, are used. "One of these is marked and called the chief. A smooth mat is spread on the ground, at the ends of which the opposing players are seated, their friends on either side, who are provided with the requisites for a noise as in the other case. The party holding the disks has a bundle of the fibres of the cedar

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[134] Powers in Contributions to North American Ethnology, Vol. III, pp. 30-152; 189-332.

[135] Contributions to North American Ethnology, Vol. III, 332; Alexander Ross's Adventures, pp. 308, 309.

bark, in which he envelops them, and after rolling them about, tears the bundle into two parts, his opponent guessing in which bundle the chief lies."[136] The same game is described by Kane, except that the counters, instead of being wrapped in one bundle which is afterward torn in two, are originally wrapped in two bundles.[137]

Still another complication of the guessing game was described by Mayne.[138] Blankets were spread upon the ground on which sawdust was spread about an inch thick. In this was placed the counter, a piece of bone or iron about the size of a half a crown, and one of the players shuffled it about, the others in turn guessing where it was.

The game of "moccasin" was but a modification of this game. As described by Philander Prescott three moccasins were used in this game by the Dacotas. The bone or stick was slipped from one to another of the moccasins by the manipulators, and the others had to guess in which moccasin it was to be found. Simple as this description seems, the men would divide into sides, playing against each other, and accompanying the game with singing.[139]

Among the Zuñis, the guessing game was exalted to the nature of a sacred festival. Frank H. Cushing[140] gives the following account of its practice. "One morning the two chief priests of the bow climbed to the top of the houses, and just at sunrise called out a 'prayer message' from the mount-environed gods. Eight players went into a *kli-wi-tain* to fast, and four days later issued forth, bearing four large wooden tubes, a ball of stone, and a bundle of thirty-six counting straws. With great ceremony, many

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[136] Contributions to North American Ethnology, Gibbs, Vol. I, p. 205.

[137] Kane's Wanderings, p. 189; Swan's Northwest Coast, p. 157; Eels in Bulletin U. S. G. Surv., Vol. III, No. 1.

[138] Mayne's British Columbia, p. 275.

[139] Schoolcraft, Vol. IV, p. 64; Domenech, Vol. II, p. 192.

[140] The Century, Vol. XXVI, p. 37.

prayers and incantations, the tubes were deposited on two mock mountains of sand, either side of the 'grand plaza.' A crowd began to gather. Larger and noisier it grew, until it became a surging, clamorous, black mass. Gradually two piles of fabrics, —vessels, silver ornaments, necklaces, embroideries, and symbols representing horses, cattle and sheep— grew to large proportions. Women gathered on the roofs around, wildly stretching forth articles for betting, until one of the presiding priests called out a brief message. The crowd became silent. A booth was raised, under which two of the players retired; and when it was removed the four tubes were standing on the mound of sand. A song and dance began. One by one three of the four opposing players were summoned to guess under which tube the ball was hidden. At each guess the cries of the opposing party became deafening, and the mock struggles approached the violence of combat. The last guesser found the ball; and as he victoriously carried the latter and the tubes across to his own mound, his side scored ten. The process was repeated. The second guesser found the ball; his side scored fifteen setting the others back five. The counts numbered one hundred; but so complicated were the winnings and losings on both sides, with each guess of either, that hour after hour the game went on, and night closed in. Fires were built in the plaza, cigarettes were lighted, but still the game continued. Noisier and noisier grew the dancers; more and more insulting and defiant their songs and epithets to the opposing crowd, until they fairly gnashed their teeth at one another, but no blows. Day dawned upon the still uncertain contest; nor was it until the sun again touched the western horizon, that the hoarse, still defiant voices died away, and the victorious party bore off their 'mountains of gifts from the gods.'"

The picturesque description of Cushing brings before our eyes the guessing game in its highest form of development. Among the tribes of the East, if it had a home at all, it was practised in such an inobtrusive way as not to attract the attention of writers who have described their habits and customs. The nearest approach to it which we can find is a guessing game described by Hennepin, as follows: "They take kernels of Indian corn or something of the kind, then they put some in one hand, and ask how many there are. The one who guesses wins."

Mackenzie[141] fell in with some Indians near the Pacific coast who travelled with him a short distance. They carried with them the implements for gambling. Their game was different from the guessing games which have been heretofore described. "There were two players and each had a bundle of about fifty small sticks neatly polished, of the size of a quill, and five inches long. A certain number of their sticks had red lines round them and as many of these as one of the players might find convenient were curiously rolled up in dried grass, and according to the judgment of his antagonist respecting their number and marks he lost or won."

The same game was seen at Queen Charlotte Islands by Francis Poole.[142] He says there were in this game from "forty to fifty round pins or pieces of wood, five inches long by one-eighth of an inch thick, painted in black and blue rings and beautifully polished." These pins were divided into two heaps under cover of bark fibre and the opposite player guessed odd or even for one of the piles.

CONTESTS OF SKILL.

Lewis and Clarke[143] describe a game among the Oregon Indians which can neither be called an athletic game

[141] Alexander MacLenzie's Voyages in 1789 and 1793. London, 1801, p. 311.
[142] Queen Charlotte Islands, a narrative, etc., p. 325. [143] Vol. II. p. 140.

nor a game of chance, but which seems to have been a simple contest of skill. "Two pins are placed on the floor, about the distance of a foot from each other, and a small hole made behind them. The players then go about ten feet from the hole, into which they try to roll a small piece, resembling the men used at draughts; if they succeed in putting it into the hole, they win the stake; if the piece rolls between the pins, but does not go into the hole, nothing is won or lost; but the wager is wholly lost if the chequer rolls outside the pins."

Morgan[144] describes a winter contest of skill among the Iroquois, which he calls snow-snake. The so-called snakes were made of hickory. They were from five to seven feet in length, a quarter of an inch in thickness, tapering from an inch in width at the head to about half an inch at the tail. The head was round, turned up slightly and weighted with lead. This implement was shot along the snow crust, by hand, with great speed, and a point in the game was gained by the snake which ran the greatest distance. When there were a number of players divided into sides, if there were two, three or more snakes of the same side which were in advance of the snakes of the other side, all such counted. Such contests usually took place between tribes and aroused a great degree of spirit and the usual amount of betting. In simpler form, Sagard Theodat describes this kind of amusement.

OTHER AMUSEMENTS OF WOMEN AND CHILDREN.

Under the name of "*Fuseaux*," La Potherie[145] describes a similar winter game of the children. He further says the women only played at platter or dice. The children

[144] League of the Iroquois, p. 303. [145] Vol. III, p. 24.

played at lacrosse, seldom at platter. We have seen that the women in some parts of the country joined in the lacrosse games. Sometimes they played it by themselves and sometimes they played other ball games which closely resemble that game. Romans describes a woman's game in which they tossed up a ball which was to be caught before it reached the ground; but in the meantime the one who tossed it had to pick up a small stick from the ground.

The women of the Natchez[146], according to Le Page du Pratz, played with three pieces of cane, each eight or nine inches long, flat on one side and convex on the other with engravings on the convex side. Two were held in the open palm of the left hand and the third was dropped round side down upon the ends of the two, so that all would fall to the ground. If two convex surfaces came up the player won. He also says, and in this Romans concurs, that the women were very reluctant to be seen while playing.

Among the Natchez, the young girls played ball with a deer-skin ball stuffed with Spanish moss. Other than that they seemed to him to have no games.[147] The young Choctaws, according to Romans, engaged in wrestling, running, heaving and lifting great weights and playing ball. Hennepin says, "the children play with bows and with two sticks, one large and one small. They hold the little one in the left, and the larger one in the right hand, then with the larger one they make the smaller one fly up in the air, and another runs after it, and throws it at the one who sprang it. They also make a ball of flags or corn leaves, which they throw in the air and catch on the end of a pointed stick."

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[146] La Page du Pratz, Vol. III, p. 2; Domenech, Vol. II, p. 192.
[147] Le Page du Pratz, Vol. III, p. 2.

Powers[148] describes a game among the children of the Nishinams which consisted in tossing bunches of clover from one to another, and another in which the boys placed themselves upon three bases and tossed a ball across from one to the other. Points were won as in base ball by running bases, if possible, without being put out by the one who at the time had the ball. The Choctaw[149] boys made use of a cane stalk, eight or nine feet in length, from which the obstructions at the joints had been removed, much as boys use what is called a putty blower. The Zuñi children are said to play checkers with fragments of pottery on flat stones.[150]

Running matches, swimming, wrestling, the simple ball-games which are hinted at rather than described, practice in archery and hurling the spear or javelin, furnished the Indian youth with such amusements as could be derived outside the contests in which his elders participated. Most of these latter were so simple as to be easily understood by the very young, and we can readily comprehend how deeply the vice of gambling must have been instilled in their minds, when they saw it inaugurated with such solemn ceremonials and participated in with such furor by their elders.

Our information concerning the habits of the Indians comes from a variety of sources. Some of it is of very recent date, especially that which deals with the Indians of the Pacific coast. The early Relations of the French Fathers were faithful, and, as a rule, intelligent records of events which the priests themselves witnessed. The accounts of the French and Indian traders and travellers

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[148] Contributions to North American Ethnology, Vol. III p. 331.
[149] Romans, p. 79; Bossu, Vol. I, p. 306.
[150] The Century, Vol. XXVI, p. 28, Cushing.

are neither as accurate nor as reliable as those contained in the Relations. Some of these authors faithfully recorded what they saw; others wrote to make books. They differ widely in value as authorities and must be judged upon their individual merits.

Much of our information concerning the manners and customs of the natives of the Pacific coast is derived from the publications of our national government. The reports which are collated in these documents are from a great number of observers and are not uniform in character, but many of them have great value. As a whole, the work was well done and in a scientific manner.

The narration of the different games tells its own story. Lacrosse is found throughout the country; platter or dice is distributed over an area of equal extent; chunkee was a southern and western game; straws a northern game with traces of its existence in the west; the guessing game was apparently a western game. Everywhere, gambling prevailed to the most shocking extent.

There are writers who seek to reduce the impressions of the extravagance indulged in by the Indians at these games. The concurrence of testimony is to the effect that there was no limit to which they would not go. Their last blanket or bead, the clothing on their backs, their wives and children, their own liberty were sometimes hazarded; and if the chances of the game went against them the penalty was paid with unflinching firmness. The delivery of the wagered wives, Lescarbot tells us, was not always accomplished with ease, but the attempt would be faithfully made and probably was often successful. Self-contained as these people ordinarily were, it is not a matter of surprise that the weaker among them should have been led to these lengths of extravagance, under the high

pressure of excitement which was deliberately maintained during the progress of their games.[151] From one end of the land to the other these scenes were ushered in with ceremonies calculated to increase their importance and to awaken the interest of the spectators. The methods used were the same among the confederations of the north and of the south; among the wandering tribes of the interior; among the dwellers in the Pueblos; and among the slothful natives of the Pacific coast.

The scene described by Cushing, where, at the summons of the "prayer-message," the Zuñis gathered upon the house-tops and swarmed in the Plaza, to hazard their property, amid prayers and incantations, upon a guess under which tube the ball was concealed, is widely different from that depicted by the Jesuit Fathers in Canada, where the swarthy Hurons assembled in the Council House at the call of the medicine man and in the presence of the sick man, wagered their beads and skins, upon the

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[151] The following extracts will illustrate these points: They will bet all they have, even to their wives. It is true, however, that the delivery of the wagered women is not easy. They mock the winners and point their fingers at them (Lescarbot, Vol. III, p. 754); all that they possess, so that if unfortunate, as sometimes has happened, they return home as naked as your hand (Lalemant Relation, 1639); their goods, their wives, their children (Ferland Vol. I, p. 134); some have been known to stake their liberty for a time (Charlevoix, Vol. III, 319); have been known to stake their liberty upon the issue of these games, offering themselves to their opponents in case they get beaten (Catlin, Vol. I, p. 132); I have known several of them to gamble their liberty away (Lawson, p. 176); a Canadian Indian lost his wife and family to a Frenchman (Sagard Theodat, Histoire du Canada Vol. I, p. 243,); they wager their wives (A. Colquhon Grant, Journal Royal Geog. Soc., London, Vol. XXVII, p. 299); their wives and children (Irving's Astoria, Vol. II, p. 91); their liberty (Parker's Journal of an Exploring Tour, pp. 248–50); Domenech has never known men to bet their wives (Vol. II, p. 191); women bet as well as men (Romans, p. 79; Am. Naturalist, Vol. XI, No. 6, 551); Philander Prescott (Schoolcraft, Vol. IV, p. 61); Cushing (Century, Vol. XXVI, p. 28); the liberty of a woman wagered by herself (Lalemant, Relation 1639); women are never seen to bet (Le Page du Pratz, Vol. III, p. 2; Mayne Br. Col., p. 276); rash gambling sometimes followed by suicide (Romans p. 79; Brebeuf, Relation 1636).

cast of the dice. It differs equally from the scene which travellers have brought before our eyes, of the Chinooks, beating upon their paddles and moaning forth their monotonous chants, while gathered in a ring about the player, who with dexterous passes and strange contortions manipulated the stone and thus added zest to the guess which was to determine the ownership of the property staked upon the game. The resemblances in these scenes are, however, far more striking than the differences. Climate and topography determine the one. Race characteristics are to be found in the other.

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ANCIENT AND MODERN METHODS OF ARROW-RELEASE.

BY EDWARD S. MORSE.

WHEN I began collecting data illustrating the various methods of releasing the arrow from the bow as practiced by different races, I was animated only by the idlest curiosity. It soon became evident, however, that some importance might attach to preserving the methods of handling a weapon which is rapidly being displaced in all parts of the world by the musket and rifle. While tribes still survive who rely entirely on this most ancient of weapons, using, even to the present day, stone-tipped arrows, there are other tribes using the rifle where the bow still survives. There are, however, entire tribes and nations who have but recently, or within late historic times, abandoned the bow and arrow, its survival being seen only as a plaything for children.

It was not till I had accumulated quite a collection of sketches and other memoranda illustrating the methods of arrow-release, not only of existing but of ancient races, as shown by frescos and rock sculpture, that I realized that even so trivial an art as that of releasing the arrow

might possibly lead to interesting results in tracing the affinities of past races.

I am led to publish the data thus far collected, incomplete as they are, with the intention of using the paper in the form of a circular to send abroad, with the hope of securing further material for a more extended memoir on the subject.

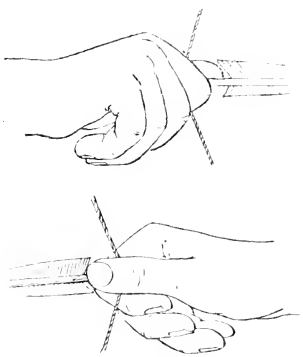
My interest in the matter was first aroused by having a Japanese friend shoot with me. Being familiar with the usual rules of shooting as practiced for centuries by the English archers, and not being aware of more than one way of properly handling so simple and primitive a weapon as the bow and arrow, it was somewhat surprising to find that the Japanese practice was in every respect totally unlike ours. To illustrate: in the English practice, the bow must be grasped with the firmness of a smith's vice; in the Japanese practice, on the contrary, it is held as lightly as possible; in both cases, however, it is held vertically, but in the English method the arrow rests on the left of the bow, while in the Japanese method it is placed on the right. In the English practice a guard of leather must be worn on the inner and lower portion of the arm to receive the impact of the string; in the Japanese practice no arm-guard is required, as by a curious fling or twirl of the bow hand, coincident with the release of the arrow, the bow (which is nearly circular in section) revolves in the hand, so that the string brings up on the outside of the arm where the impact is so light that no protection is needed. In the English method the bow is grasped in the middle, and consequently the arrow is discharged from a point equidistant from its two ends, while the Japanese archer grasps the bow near its lower third and discharges the arrow from this point. This altogether unique method, so far as I am aware, probably arose from the custom of the archers in feudal times

shooting in a kneeling posture from behind thick wooden shields which rested on the ground. While all these features above mentioned are quite unlike in the two peoples, these dissimilarities extend to the method of drawing the arrow and releasing it. In the English method the string is drawn with the tips of the first three fingers, the arrow being lightly held between the first and second fingers, the release being effected by simply straightening the fingers and at the same time drawing the hand back from the string; in the Japanese method of release the string is drawn back by the bent thumb, the forefinger aiding in holding the thumb down on the string, the arrow being held in the crotch at the junction of the thumb and finger.

These marked and important points of difference between the two nations in the use of a weapon so simple and having the same parts,— namely, an elastic stick, a simple cord, a slender barbed shaft,— and used by the two hands, naturally led me to inquire further into the use of the bow in various parts of the world, and to my amazement I found not only a number of totally distinct methods of arrow-release with modifications, or sub-varieties, but that all these methods had been in vogue from early historic times. Even the simple act of bracing or stringing the bow varies quite as profoundly with different races.

The simplest form of release is that which children the world over naturally adopt in first using the bow and arrow, and that is grasping the arrow between the end of the straightened thumb and the first and second joints of the bent forefinger. I say naturally, because I have noticed that American as well as Indian and Japanese children invariably grasp the arrow in this way in the act of shooting. With a light or weak bow, such a release is the simplest

and best; and in this release it makes but little difference upon which side of the bow the arrow rests, provided the bow is held vertically. This release, however, prevents the drawing of a stiff bow unless one possesses enormous



Figs. 1 and 2. Primary release.

strength in the fingers. Figs. 1 and 2 illustrate this release. Arrows used in this release are usually knobbed at the nock, or proximal end of the arrow, for conven-

Fig. 3. Knobbed arrow from Oregon.

ience of holding; and an arrow of this form indicates a release of this or of a similar nature (Fig. 3).

The Ainos of Yezo practice this simple release. Their bow is short and highly strung when in use, and an arm-

guard is not required, as the recoil of the string, from the high tension of the bow, is arrested before striking the arm. Some of the old English archers also avoided the use of the arm-guard by using highly strung bows.

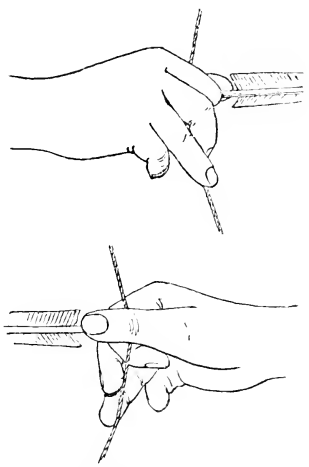
It is recorded that the Demerara Indians of South America practice this form of release; and from a photograph of a Ute Indian in my possession I should infer that that tribe also practiced this release. Col. James Stevenson informs me that when the Navajos shoot at prairie dogs they use this release, so that the arrow will not penetrate the ground if it misses its mark; and Mr. Daniel S. Hastings informs me that the Chippewa Indians sometimes practice this release.

I am indebted to Dr. S. J. Mixter for a photograph which he made for me, of an old Micmac Indian in the act of releasing the arrow in the primary way. The man is one of the oldest Micmacs in the Cascapedia settlement on the north shore of the Bay of Chaleur and he informed Dr. Mixter that he often used the bow when a boy, and practiced the release as represented. He also said that the other tribes in that part of Canada in the use of the bow drew the arrow in the same way. A member of the Penobscot tribe at Moosehead Lake gave me the primary release as that practiced by the tribe, and seemed incredulous when I told him that there were other methods of drawing the arrow.

This primitive method of releasing the arrow I shall designate as the *Primary release*.

The next form of release to be considered is one which is a direct outgrowth from the primary release. This release consists in grasping the arrow with the straightened thumb and bent forefinger, while the ends of the second and third fingers are brought to bear on the string to as-

sist in drawing. Figs. 4 and 5 illustrate the attitude of the hand in this release. Mr. Paul Mamegowena, an Ottawa Indian, informs me that his tribe practice this release, and he illustrated the method to me. Through the courtesy of Mr. Frank Hamilton Cushing I was enabled to make inquiries of a number of Zuñi chiefs in regard to their



Figs. 4 and 5. Secondary release.

method, and the release practiced by them differed in no respect from that of the Ottawas.

Mr. Daniel S. Hastings, formerly civil engineer on the Northern Pacific Railroad writes to me as follows regarding the Chippewa Indians of northern Wisconsin: "I have watched the Indians so as to find out their manner of drawing back the bow-string and releasing the arrow, and I find they all agree in one respect: they all grasp the arrow

between the thumb and forefinger. Some of them use the thumb and forefinger alone, while others use the second, and still others add the second and third fingers to assist in pulling the string back, and let the string slip off the ends of the second and third fingers at the same instant the arrow is released from between the thumb and forefinger." This release, though clearly distinct from the primary release, is an advance upon it in the added assistance of one or two fingers in pulling back the string; and the description given by Mr. Hastings is confirmatory of the natural relations existing between the two releases. For this reason it will be designated as the *Secondary release*.

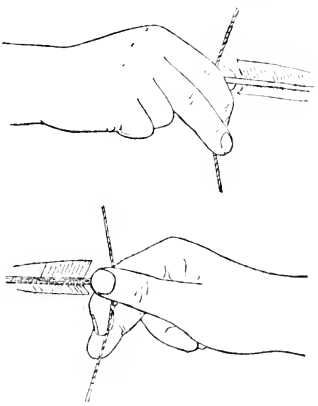
Mr. La Flesche, an intelligent Omaha, showed me a release practiced by his people which differs sufficiently from the secondary release to warrant its recognition as a separate form. In this release the forefinger, instead of being bent, is nearly straight with its tip, as well as the tips of the second and third fingers, pressing or pulling on the string, the thumb, as in the primary and secondary release, active in assisting in pinching the arrow and pulling it back. This release I shall call the *Tertiary release*. (See Figs. 6 and 7.)

Lieut. A. W. Vogdes, U. S. A., has informed me that the Sioux, Arapahoes, and Cheyenne practice the tertiary release; and Col. James Stephenson has noticed this release practiced not only by the two latter tribes but by the Assiniboins, Comanches, Crows, Blackfeet, and Navajos. Mr. La Flesche and Lieut. Vogdes informed me that the tribes using this release held the bow nearly horizontally.

In holding the bow horizontally the release-hand is held with the palm uppermost, the arrow, of course, resting on the bow. In the Zuñi and Ottawa practice, the bow

being held vertically or nearly so, the arrow is placed at the left of the bow. It is possible that originally the bow was held horizontally, but necessities arising, as in shooting in a forest, or shooting side by side with others closely appressed, the bow was required to be held vertically. In thus turning the bow-hand in the only way it could be turned conveniently, the arrow would be brought to the left of the bow vertical.

As will be shown further on, the position of the arrow



Figs. 6 and 7. Tertiary release.

either to the right or to the left of the bow vertical is determined in most cases by the method of release.

In the primary and secondary releases, however, it makes but little difference on which side the arrow is placed; and some tribes, using the bow vertical, place the arrow to the right, and this is probably a quicker way of adjusting the arrow when shooting rapidly. Col. James Stevenson informs me that Navajo Indians practice three methods of release, namely, the primary release already

alluded to, the tertiary release, and a variety of the Mediteranean release, which will be described further on.

During the recent visit of the Siamese embassy to this country, I obtained from its members through the courtesy of Mr. Wilberforce Wyke, interpreter, some interesting facts concerning the use of the bow in Siam. It was curious to find that the Siamese practiced the tertiary release; with this difference, however, that one finger only is used on the string instead of two. Mr. Nai Tuan illustrated the method to me, and explained that little use was made of the bow and arrow, its practice being confined to the shooting of small birds and fishes.

Major Snayh of the embassy told me that poisoned arrows were also used, in which case the bow was held horizontally, and the bow-hand grasped not only the bow, but a grooved board in which the arrow rested. In the last century, it was customary for the Turkish archer to use a grooved piece of horn which was held in the bow-hand directed towards the string. In this grooved piece the arrow ran, and by this contrivance the bow could be drawn much further back, even to the extent of bringing the head of the arrow four or five inches within the bow. According to Wilkinson, the ancient Egyptians were familiar with this curious adjunct to the bow.

E. H. Man, Esq., in his work on the Andaman Islanders,[1] p. 141, says that the inhabitants of Great Andaman "place the arrow in position between the thumb and top joint of the forefinger, and draw the string to the mouth with the middle and third finger." As Mr. Man in this description does not speak of the forefinger as bent and

[1] On the Aboriginal Inhabitants of the Andaman Islands. By Edward Horace Man. Reprinted from the Journal of the Anthropological Institute of Great Britain and Ireland.

pressed against the arrow, the release practiced by these people must be the tertiary release.

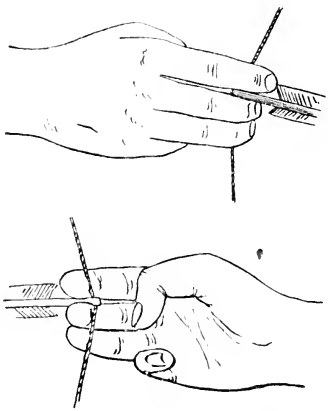
We have thus far considered three methods of release, of which the thumb and bent forefinger appressed forms the simplest and probably one of the earliest forms; and this we have called the primary release. The secondary release differs only in the application of the tips of the second finger, or second and third fingers, to the string, and must be regarded as a development of the primary release, though forming a distinct method. The third release differs in the position of the forefinger, which, instead of being bent and pressed against the arrow, is nearly straight, its tip, as well as the tips of the second and sometimes that of the third finger, engaging the string. This constitutes the tertiary release.

We come now to consider a release which by documentary evidence has been in vogue among the northern Mediterranean nations for centuries, and among the southern Mediterranean nations for tens of centuries. It is the oldest release of which we have any knowledge. It is practiced to-day by all modern English, French, and American archers, and is the release practiced by European archers of the Middle Ages. This release consists in drawing the string back with the tips of the first, second, and third fingers, the balls of the fingers clinging to the string, with the terminal joints of the fingers slightly flexed. The arrow is lightly held between the first and second fingers, the thumb straight and inactive.

Since this release has been practiced by the Mediterranean nations from early historic times, it may with propriety be called the *Mediterranean release*. The following figures (Figs. 8 and 9) illustrate this form of release.

In the practice of this release, the attrition of the string on the fingers is so severe that a leather glove or leather

finger-tips are worn, though some archers are enabled by long service to shoot with their fingers unprotected. Roger Ascham, in his "Toxophilus," written in 1544, says: "A shootinge glove is chieflye for to save a man's fingers from hurtinge, that he may be able to beare the sharpe stringe to the uttermoste of his strengthe. And when a man shooteth, the might of his shoote lyeth on the foremost finger, and on the ringman; for the middle



Figs. 8 and 9. Mediterranean release.

finger which is longest, like a lubber, starteth back, and beareth no weight of the stringe in a manner at all; therefore the two fingers must have thicker leather, and that must have thickest of all whereon a man lowseth most, and for sure lowsinge the foremost finger is most apt, because it holdeth best, and for that purpose nature hath, as a man would say, yocked it with the thoumbe."

Hansard, in his "Book of Archery," states that the Flemings use the first and second fingers only, a method adopted by some English bowmen. This Fleming variety of the

Mediterranean release, as we shall soon see, was probably the usual form in the Middle Ages. Among the many curious matters of interest concerning archery, which may be found in Hansard's book, is the description of a quaint black-letter volume which the author dug out in the Royal Library of Paris. This volume was written at the close of the thirteenth or beginning of the fourteenth century. It is entitled "The Book of King Modus," and is a treatise on the use of the bow in hunting. Among other matters is a chapter of "Instructions in the Art of Archery;" and in regard to the release, it says that "you draw the arrow with three fingers, holding the nock between the forefinger and the next thereto."

Associated with this release is the necessity of placing the arrow on the left of the bow held vertically. This position is necessitated by the fact, that as the string is pulled back the friction of the fingers which clutch the arrow tends to swing the arrow to the right; at the same time the friction of the fingers on the string causes the string to rotate somewhat to the right, and this tends to displace the arrow.

In a release of this nature, the arrow must be to the left of the bow vertical; and carved figures, manuscript drawings, and sculpture, in which the arrow is represented otherwise in connection with the Mediterranean release, must be incorrect. This release is unquestionably an advance on the others thus far described, as it enables the drawing of a stiffer bow, and is exceedingly delicate and smooth at the instant of loosing the arrow.

Mr. John Murdock, who accompanied the United States Signal Survey Expedition to the northwest coast of Alaska, has kindly furnished me the information that the Eskimo of Point Barrow practice the Mediterranean release, using, however, only the first and second fingers in drawing the string. I am also indebted to Mr. Mur-

dock for calling my attention to two other references concerning the practice of archery among these Arctic people.

Mr. Ludwig Kumlien, naturalist of the Howgate Polar Expedition, says of the Cumberland Sound Eskimo, "In shooting this weapon the string is placed on the first joint of the first and middle fingers of the right hand."[1]

The Krause brothers state that the natives of East Cape, Siberia, do not hold the arrow between the thumb and first finger, but between the first and middle fingers.[2]

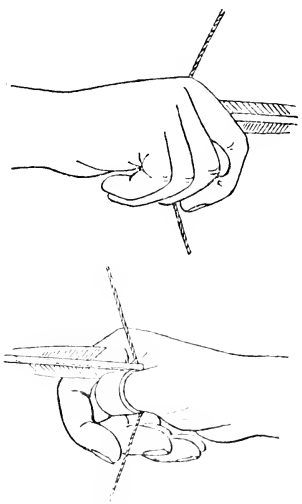
Neither of these descriptions is complete, and yet both indicate unmistakably the Mediterranean release. It was somewhat surprising to find this release among the tribes of Eskimo, for I had supposed that the arrow-release of this people would be either in the form of the primary or secondary release. As a confirmation of this unlooked-for method of shooting among the west-coast

Fig. 10. Point Barrow Eskimo arrow, half size. *a*, end view.

Eskimo at least, Mr. Murdock called my attention to the shape of the nock end of their arrow, which was greatly flattened at right angles to the nock, so that it offered greater convenience for grasping between the fingers. It is possible also that this peculiar flattening may have something to do with the flight of the arrow. This flattening of the arrow I have never observed before; and an arrow of this shape must indicate unmistakably the method of release employed, for in no other form of release with which I am familiar could the arrow be discharged. Fig. 10 gives the appearance of this arrow.

[1] Bulletin of the U. S. National Museum, No. 15, p. 37.
[2] Deutsche geographische Blätter, Vol. I, p. 33.

If Mr. Man's information be correct, then the tribes inhabiting the Little Andaman practice the Mediterranean release. In his work on the Andaman Islanders before alluded to, the author says (p. 141) that the Jär'awa, or the tribes which inhabit the Little Andaman and southern portions of the Great Andaman, "adopt the plan usual among ourselves of holding the nock of the arrow inside the string by means of the middle joints of the fore and



Figs. 11 and 12. Mongolian release.

middle fingers, and drawing the string with the same joints."

While the four releases thus far described may be considered successive modifications of each other, though I do not mean to imply that they are so necessarily, the release which we are about to examine is an entirely independent form, having no relation to the others. In this release the string is drawn by the flexed thumb bent over

the string, the end of the forefinger assisting in holding the thumb in this position. Figs. 11 and 12 illustrate this release. The arrow is held at the junction of the thumb and forefinger, the base of the finger pressing the arrow against the bow. For this reason the arrow is always placed to the right of the bow vertical.

This release is characteristic of the Asiatic races, such as the Manchu, Chinese, Korean, Japanese, Turk, and doubtless other cognate peoples. The Persians also practice this release, which they probably acquired from their proximity to, and association (friendly and otherwise) with, Asiatic people of past times.

As this release is practiced almost exclusively by Mongolian nations, it may be called the *Mongolian release*.

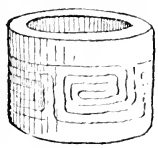


Fig. 13.
Chinese thumb-ring.

In this release the thumb is protected by a guard of some kind. With the Manchu, Chinese, and Turk, as well as with the Persian, this guard consists of a thick ring, which is worn near the base of the thumb. The thick edge of the ring is brought to bear upon the string as it is drawn back, and at the same time the string is quickly released by straightening the thumb. The ring may be made of any hard material, such as horn, bone, ivory, quartz, agate, or jade. These rings are often very expensive. I was shown one in Canton that was valued at three hundred dollars. Fig. 13 illustrates an ordinary horn ring such as the Cantonese use.

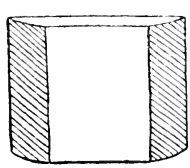


Fig. 11.
Chinese thumb-ring of jade, in section.

Fig. 14 shows a Chinese thumb-ring in section, made of jade. This ring, being used with bows having thicker strings, is correspondingly larger. The Korean thumb-ring is quite unlike that used by the Chinese, as will be seen

by Fig. 15. The ring is thin, and from its shape is evidently used to protect the ball of the thumb. The string is not engaged by the edge of the ring, as in the Chinese

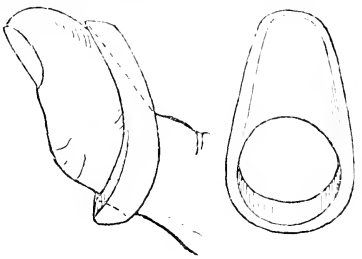


Fig. 15. Korean thumb-ring.

method, but rests upon the side of the ring.[1] The Japanese archer, instead of using a thumb-ring, is provided with a

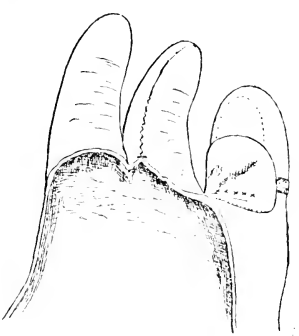


Fig. 16. Japanese archer's glove (portion only shown).

glove consisting of thumb and two fingers. The wrist of the glove is firmly bound to the wrist by a long band,

[1] I was told by a Korean ambassador in Tokio, that in archery the Koreans are taught to draw the arrow with either hand, but considered the left hand most efficient. In illustrating the method of release he drew the arrow with his left hand. The bow is firmly grasped, and an arm-guard is worn.

which is fastened to one flap, passes through a hole in the opposite flap, thus enabling it to be pulled up like a noose, and then is wound tightly about the wrist several times. The thumb of the glove is much thickened, and is very hard and stiff (Fig. 16). Its operation is like that of the Korean thumb-ring.

In the Korean and Japanese practice the first and second fingers assist in holding the thumb bent on the string, while in the Manchu release only the first finger is so

Fig. 17. Manchu.

used, the other three fingers being inactive and closed. There are doubtless other modifications of this release; the essential features however remain the same.

A young Japanese from the north of Japan, in illustrating to me his method of release, drew the string back with the thumb and interlocked forefinger as already described, and assisted the drawing back of the string with the tips of the second and third fingers, as shown in the *secondary release*.

The accompanying figure illustrates the attitude of the shaft hand of a Manchu as seen from above, which I sketched from a Manchu soldier at Canton. (Fig. 17.) The

Persians and Turks use the thumb-ring in the same way. Fig. 18, representing the Persian thumb-ring, is copied from a drawing given in Meyrick's "Ancient Armour." Hansard, referring to another author, says that "one of the early Turkish Sultans occupied his leisure in manufacturing these rings," distributing them as presents among his favorite pashas; and adds also that the carnelian thumb-rings may be easily procured in the Bazäars of Constantinople.

Some notes in regard to Persian archery may be found in "Hansard's Book of Archery," p. 136.

The "Archers' Register" published a number of notes from a manuscript copy of "Anecdotes of Turkish Archery procured from Constantinople by Sir Robert Ainslie, and translated by his interpreter, at the request of Sir Joseph Banks, Baronet, 1797," from which we quote:—

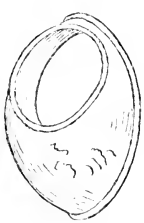


Fig. 18.
Persian thumb-ring.

"The bow, instead of being drawn with three fingers on the string, according to our mode, was drawn by the right thumb, with the arrow placed on the string immediately above it. A thumb-piece, or guard of bone, answering the purpose of our 'tips,' was worn. It covered the ball of the thumb, one end being made as a ring and passed over the joint. A projecting tongue in the inside prevented the string slipping off the guard into the angle of the thumb formed by the bent joint. The inside of the guard was lined with leather. A curious contrivance, consisting of a horn-groove several inches in length, fixed on a foundation of wood attached to a leather strap and buckle, was fastened on the bow-hand. The groove projected inwards. The arrow was laid in this groove, which rested on the thumb, and was rather higher on the outside, as the arrow was shot on the right side of the bow, on the contrary side to what it is in England."

There are doubtless other forms of release, but those already given probably comprise the principal and most efficient ones.

At Singapore I was enabled to secure, through the kindness of D. F. A. Hervey, Esq., of Malacca, a Malay release of the Temiang tribe, originally from Sumatra. The bow was held in an horizontal position (a hole being made in the centre of the bow through which the arrow passed), the three fingers bent over the string, and the arrow held between the first and second fingers, the thumb straight-

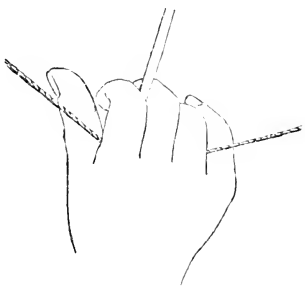


Fig. 19. Temiang release.

ened, and the little finger partially straightened and bearing against the string as in the figure (Fig. 19). This was a weak release, and was used only in the shooting of small game and fish. An entirely different form of release is used by this people in shooting fire at the spirit of sickness. The bow is perforated as in the bow above mentioned; the arrow has a shoulder near the distal end which prevents it passing through the hole, and the nock is fastened to the string. A ball of inflammable material is loosely placed on the end of the arrow, and when the arrow is released it is suddenly checked by its shoulder striking

the bow and the fire-ball is projected into the air by its momentum. The release in this act is shown in Fig. 20.

The first finger passes above the string and under the arrow, the thumb being straightened and the arrow grasped between the thumb and finger. This is a most awkward and inefficient release; and as the descriptions of this and the previous Malay release were given me by an old man, who was at the time being questioned by Mr. Hervey in the interest of philology, it is possible that the releases may have been incorrectly described.

The releases thus far given comprise those forms which have been studied from life.

It now remains for us to examine the releases of ancient

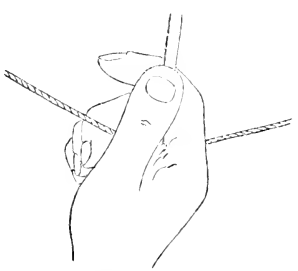


Fig. 20. Temiang release when shooting at spirit of sickness.

peoples which are made known to us through illuminated manuscripts, frescos, rock sculpture, and other graphic methods. From the conventional way in which many of these are depicted, great difficulty is encountered in properly interpreting the exact method of release intended. In many cases, especially in certain forms of the ancient Egyptian, as shown in the frescos, and early Grecian, as represented on their decorative vases, it is well nigh impossible to recognize any mode in which the arrow could be drawn. In some cases the release might be intended

to represent either of two or three kinds. That many releases are represented incorrectly there can be no doubt. In figures of Egyptian archers, the hand is depicted as daintily pulling the arrow in a way that could not possibly accomplish the drawing of a stiff bow; and that the Egyptian archer used a stiff bow is seen in the vigorous manner in which he is represented as bracing it with knee pressed against its middle, while tying the cord above.

It will be best, however, to give a description of those releases that can be clearly interpreted, beginning with the Assyrian. I had a brief opportunity of studying the wonderful collection of Assyrian slabs at the British Museum, and also the Assyrian collections at the Louvre. In the various scenes of war and hunting so graphically depicted, the most perfect representations of archers in the act of drawing the bow are given.

At the outset I met with a very curious and unaccountable discrepancy in the form of release employed, and that was when the archer was represented with his right side, or shaft hand, toward the observer, the hand was with few exceptions in the attitude of the primary or secondary release; whereas if the archer was represented with his left side, or bow hand, toward the observer, the release with few exceptions represented the Mediterranean release. Or, in other words, as one faces the sculptured slab the archers, who are represented as shooting towards the right, show with few exceptions either the primary or secondary release, while those shooting towards the left are with few exceptions practicing the Mediterranean release!

If in every case the Assyrians were represented on the left, as one faces the tablet, fighting the enemy on the right, then one might assume that the enemy was practicing a different release. In an Egyptian fresco, for ex-

ample, where Rameses II. is depicted in his chariot fighting the Arabs, the enemy is represented as practicing a different release. While in many cases the Assyrians are on the left of the picture, in other cases they are on the right, and shooting towards the left. It is therefore difficult to decide which release was practiced by them; and all the more so, since, with very few exceptions, the releases are perfect representations of forms practiced today, which have already been described. I have suspected that in one or two cases the Mongolian release might have been intended, though in no case is the thumb-ring represented, though other details of arm-guards, bracelets, etc., are shown with great minuteness.

Taking the releases as they are represented in the sculpt-

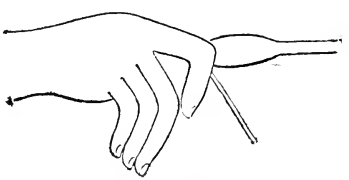


Fig. 21. Assyrian.

ures without regard to the discrepancies above noted, it is an extremely interesting fact that all the earlier Assyrian archers, that is, of the time of Assurnazirpal, or 884 B. C., the release represented is the primary one, as shown in Fig. 21; while in the archers of the reign of Assurbarnipal, or 650 B. C., the secondary release is shown, or a variety of it, in which the tips of all three fingers are on the string, as shown in Fig. 22. Between these two epochs the sculptures ranging from 745–705 B. C., notably a slab representing the campaign of Sennacherib showing assault on the Kouyunjik Palace, both the primary and secondary releases are represented. If any reliance can

be placed on the accuracy of these figures, an interesting relation is shown in the development of the secondary from the primary release, as urged in the first part of this paper. Possibly a proof that the primary release is in-

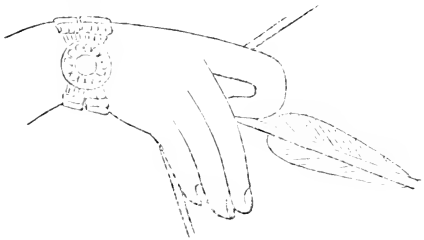


Fig. 22. Assyrian.

tended is shown in the fact that the arrows are represented with the nock end bulbous.

On tablets in the British Museum of this intermediate age, or during the reign of Tiglath Pileser, is the first representation of an archer with the right side towards the

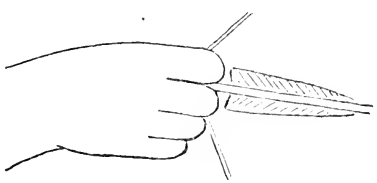


Fig. 23. Assyrian.

observer practicing the Mediterranean release; and on slabs of the date of 650 B. C., one showing Assurbarnipal's second war against Elam, and another one representing the siege of the city of Al-ammu, a number of archers with their right towards the observer are practicing the Mediterranean release (Fig. 23). In the Mediterranean release, which, as I have before remarked, is represented,

with few exceptions, by all the archers having the bow-hand towards the observer, there are two varieties shown: one in which three fingers are on the string, and another

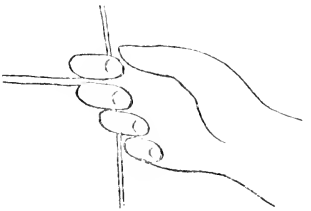


Fig. 24. Assyrian.

with only two fingers drawing the bow, as shown in the accompanying figures (Figs. 24, 25). The Mediterranean release occurs in Assyrian sculpture as early as 884

Fig. 25. Assyrian.

B. C., as shown on a marble slab in the British Museum representing the siege of a city by Assurnazirpal (Fig. 26). A curious form is shown in Fig. 27, showing Assur-

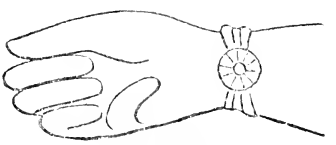


Fig. 26. Assyrian.

barnipal in a chariot, shooting lions. The string below is concealed by the archer's arm. The secondary release is probably intended.

In regard to the bow-hand, the thumb is sometimes represented as straight and guiding the arrow, and in other cases as braced inside of the bow. In this connection it may be interesting to note that in the earliest Assyrian bows the ends of the bows are straight and blunt, the nocks being a simple groove and the string being tied

Fig. 27. Assyrian.

whenever the bow is braced, as in certain modern Indian and Aino practice. Other bows are shown at this period with a nock somewhat oblique, and it is possible that the string might have been looped and slipped into the notch, as in the modern English bow.

In the later slabs, that is 650 B.C., the ends of the bow are shown abruptly bent, the bent portion in some cases

Fig. 28.

Fig. 29.

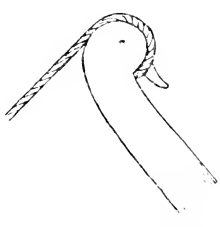


Fig. 30.

being carved to represent a bird's head. In the bracing of this bow the string has a permanent loop, and the assistance of a second person is required to slip this loop over the point of the nock while the archer is employed in bending the bow, which is done by drawing the ends of the bow towards him, the knee at the same time being pressed in the middle of the bow. (Figs. 28, 29, 30.) In

the earlier reign, the arrows are shown with larger nocks and the barbs, long and narrow, with their outer edges generally parallel to the shaft. The nock end of the arrow is bulbous, as before remarked; and if this is correctly represented it would settle the question as to the primary release being the one intended. In the later slabs, the arrow has shorter barbs, with the feathers tapering forward towards the point, and the nock end of the arrow is not bulbous.

A more careful study than I was able to give to these sculptures may probably modify the general statements here made concerning the variations in time of the bow and arrow.

Concerning the practice of archery among the ancient Egyptians, Wilkinson in his classical work mentions only two forms of release. He says their mode of drawing the bow was either with the thumb and forefinger or with the first and second fingers.[1] Rawlinson makes the same statement.[2] These two forms as defined by these authors would be the primary and Mediterranean releases.

If the representations of the drawings and frescos in ancient Egyptian tombs, as given by Rosallini, Lepsius, and others, are to be relied on, then the ancient Egyptians practiced at least three, and possibly four, definite and distinct methods of release.

That many of the releases depicted in these old sculptures and frescos are conventional simply, there can be no doubt; indeed, some of the releases are plainly impossible, notably that form which shows the archer daintily drawing back a stiff bow with the extreme tips of the first two fingers and thumb. Again, the figure of Rameses II. (see

[1] Manners and Customs of the Ancient Egyptians, 2nd series, Vol. I., p. 207.
[2] History of Ancient Egypt, Vol. I., p. 471.

Wilkinson, Vol. I., p. 307), which shows the bow vertical while the shaft-hand is inverted, that is, with palm uppermost, is an equally impossible attitude. Other releases identify themselves clearly with forms already described, and with slight latitude in the interpretation of the conventional forms we may identify these as belonging to known types.

The earliest releases are those depicted on the tombs of Beni Hassan of the time of Usurtasen I., which according

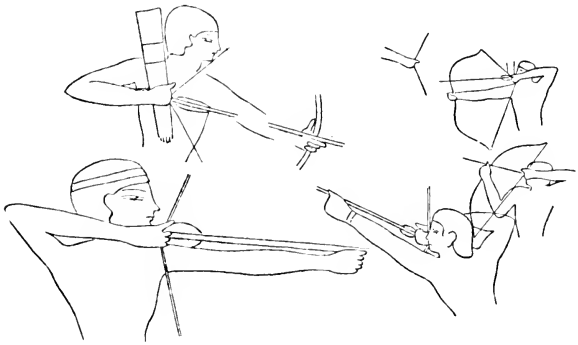


Fig. 31. Early Egyptian.

to the conservative chronology of Professor Lepsius dates 2380 B.C. Here the Mediterranean release is unmistakably shown. The following figure (Fig. 31) from these tombs, copied from Rosallini's great work, indicates this form of release in the clearest manner. In these figures it is interesting to observe that the arrow is drawn to the ear, and also that the archers are represented as shooting with the left as well as with the right hand.

Making a stride of over a thousand years and coming down to the time of Seti I. (1259 B.C.), we have represented a release as well as a mode of drawing the arrow above and

behind the ear, which recalls in the action of the arm certain forms of the Mongolian release. (Fig. 32.) It is true the attitude of the hand might be interpreted as representing the thumb and bent forefinger as shown in the

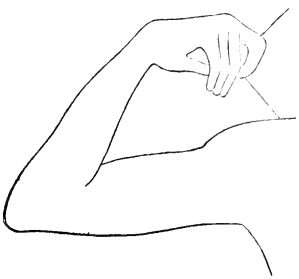


Fig. 32. Egyptian. Seti I.

primary release, but the free and vigorous drawing of the bow as shown in the figure could not possibly be accomplished in the primary form with a bow of any strength. Furthermore, the attitude assumed by the Manchu and

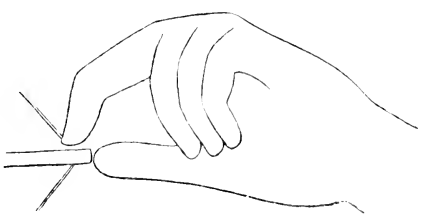


Fig. 33. Egyptian. Rameses II.

Japanese archer in the Mongolian release vividly recalls this picture of Seti. Egyptologists state that Seti I. was occupied early in his reign with wars in the east and in resisting the incursions of Asiatic tribes; and we venture to

offer the suggestion that during these wars he might have acquired the more vigorous release as practiced by the Asiatics.[1] Whatever may be the method depicted in the drawing of Seti, it is quite unlike the releases of the time of Usurtasen, and equally unlike the figures of Rameses II., which are so often portrayed.

In Figs. 33, 34, copied from Rosallini, the thumb and the forefinger partially bent may be intended to represent the primary release, as in no other way could be interpreted the bent forefinger and straightened thumb holding

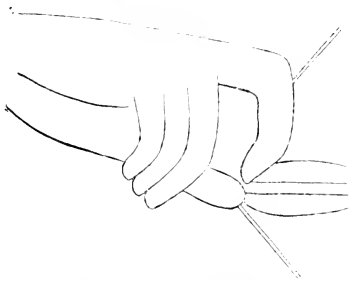


Fig. 34. Egyptian. Rameses II.

the tip of the arrow, with three other fingers free from the string.

In the British Museum are casts of a hunting scene, and also of battle scenes of the time of Rameses II., in which the shaft-hand of the archer is in an inverted position. This form of release associated with a vertical bow is an impossible one. Either the hand is wrongly drawn, or the attitude of the bow is incorrectly given. The only explanation of this discrepancy is the assumption that the bow was

[1] It would be extremely interesting to know whether any object answering the purpose of a thumb-ring has ever been found among the relics of ancient Egypt.

really held in an horizontal position, and the release practiced was the one I have designated as the tertiary release. The Egyptian artist, ignorant of perspective drawing and utterly unable to represent a bow foreshortened, has drawn the bow in a vertical position. As a further proof of this, we find that the tribes of North American Indians and the Siamese who practice the tertiary release usually hold the bow in an horizontal position. An examination of the accompanying figures will make this clear. Fig. 35 is copied from the cast referred to in the British Museum; Fig. 36, from Wilkinson, Vol. I., p. 307; Fig. 37, from Wilkinson, Vol. I., p. 309. Reginald Stuart Poole, Esq., of the British Museum, has kindly sent me an outline of the nock end of the ancient Egyptian arrow which shows a straight and

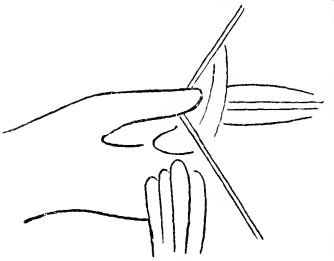


Fig. 35. Egyptian.

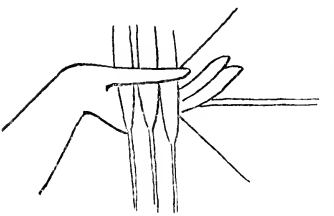


Fig. 36. Egyptian.

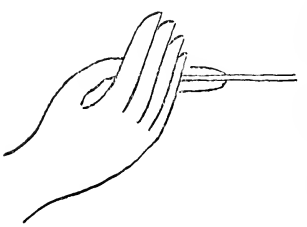


Fig. 37. Egyptian.

cylindrical shaft. Figs. 38, 39, 40, and 41 are copied from Rosallini. Fig. 38 is probably intended for the primary, Fig. 39 the tertiary probably, and Figs. 40 and 41 the Mediterranean form.

Turning now to the practice of archery among the ancient Grecians, we should expect to find among these peo-

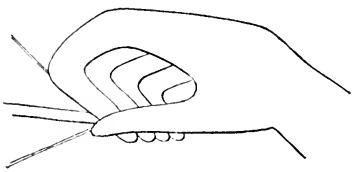


Fig. 38. Egyptian.

ple, at least, the most distinct and truthful delineations of the attitude of the hand in shooting. Hansard, in his "Book of Archery," p. 428, says of the ancient Greek archers, "Like the modern Turks, Persians, Tartars, and many other Orientals, they drew the bow-string with their thumb, the arrow being retained in place by the forefinger. Many

Fig. 39. Egyptian.

sculptures extant in public and private collections, especially those splendid casts from the Island of Egina now in the British Philosophical and Literary Institution, represent several archers drawing the bow-string as I have described."

A study of a number of ancient Grecian releases as shown in rock sculpture and on decorated vases reveals only one release that might possibly be intended to represent the Mongolian method, and this is shown on a Greek

vase (black figures on red) figured in *Auserlesene Vaserbilder*. With this exception the releases thus far examined are as various, and many of them quite as enigmatical, as those seen among the ancient Egyptians. I puzzled for a long time over these sculptures from the temple of

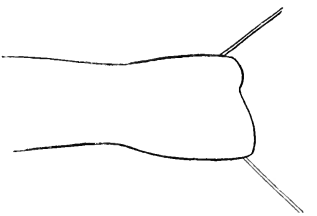


Fig. 40. Egyptian.

Athena to which Mr. Hansard refers, and was forced to come to the conclusion that, despite their acknowledged accuracy, the release was an impossible one. It was not till sometime after that I learned that the figures had been carefully restored by Thovaldsen, and the restored parts com-

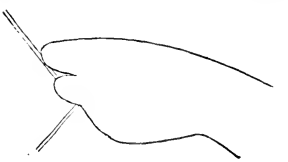


Fig. 41. Egyptian.

prised the hands and arms, as well as the extremities of most of the figures. With this information I had occasion to hunt up a history of these figures, and found the following in a work by Eugene Plon entitled "Thovaldsen his Life and Works," republished in this country by Roberts Brothers. The figures were restored by Thovaldsen in 1816. Among the restored parts were the hands of the archers. "The statues were in Parian marble, and he used so much

care in matching the tints of the new pieces as almost to deceive a practiced eye. He was frequently asked by visitors to the Atelier which were the restored parts. 'I cannot say,' he would reply laughing; 'I neglected to mark them, and I no longer remember. Find them out for yourself if you can'" (p. 56). Of these restorations, however, it is possible that Mr. Hansard was not aware, though if he had ever attempted drawing a bow in the manner represented in these figures, he would have seen the absurdity as well as the impossibility of the attitude; and, furthermore, had he been at all familiar with the Mongolian release he would have seen that there was really no approach to the form as employed by the Manchu, Korean, Japanese, or Turk. The following figure (Fig. 42) is sketched from the set of casts in the Museum of Fine Arts in Boston. An examination of these

Fig. 42. Thovaldsen's restoration of hand.

figures will show that the angle made by the shaft-hand in relation to the bow-hand is also inaccurate. A release that might at first sight suggest the Mongolian form is shown in the accompanying figure (Fig. 43) representing an Amazon archer, which is painted on a Greek vase of the 4th century B.C. The forefinger seems to be holding the end of the thumb, but the thumb is not hooked over the string as it ought to be. If the hand be correctly drawn it represents quite well the tertiary release; and this supposition is borne out by two sculptures, one from the Temple of Apollo Epicurius at Phigalia (Fig. 44), and another from

Lycia, Asia Minor. (Fig. 45.) In these two examples the hand seems to be in the attitude of drawing the bow, with the fingers partially bent on the string, and the thumb

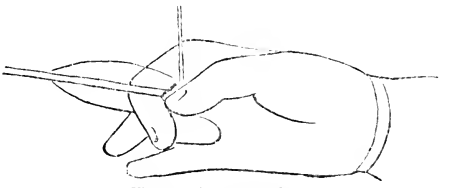


Fig. 43. Amazon archer.

assisting in holding the arrow; and this is the form of the tertiary release.

The earliest Greek release that I have seen is represented

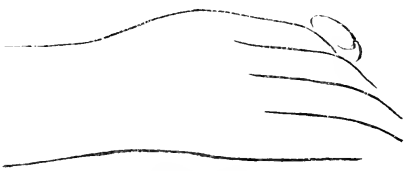


Fig. 44. Phigalia.

on a block of stone sent to this country by the Assos Exhibition, and now the property of the Boston Museum of Fine Arts. It is supposed to date about 2200 B. C.

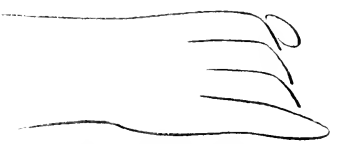


Fig. 45. Lycia, Asia Minor.

In this figure the hand is vigorously grasping the string, with the first and second fingers abruptly bent, the third and fourth fingers apparently having been broken away. (Fig. 46.)

If this release really represent a permanent form of shooting, then this form should have been designated the primary release; but, so far as I have learned, it seems to be a temporary mode resorted to only under special conditions. In testing the stiffness of a bow, for example, the string is grasped in this manner. An instance of this is seen on one of the Assyrian slabs, where the king is represented as trying a bow. I was informed by a Zuñi chief that when shooting in a great hurry the string was vigorously clutched by three or four fingers, the arrow being held against the first finger by the thumb.

The Ainos on the west coast of Yezo also informed me

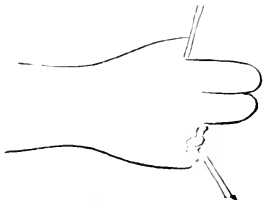


Fig. 46. Assos.

that when shooting in great haste the string was clutched in precisely this manner. In the use of a bow of any strength, the attrition of the string on the fingers must be very severe; and only a hand as tough, and as thoroughly calloused as the paw of an animal, could endure the friction of the string in such a release. For convenience of reference this form may be referred to provisionally as the *Archaic release*.

In a bas-relief in marble representing Herakles drawing a bow, a figure of which is given in Rayet's *Monuments de l'Art Antique*, it is rather curious that the hand is represented as clutching the string in the vigorous manner just described. The date of this work is put down as the fourth or fifth century B. C. Doubts have been expressed

as to the genuineness of this work. Dr. Alfred Emerson has expressed his belief in the "American Journal of Archæology," Vol. I., p. 153, that the work is a modern fraud. In the following number of the Journal Mr. Furtwängler defends the work, but would place it not earlier than the first century B. C. He says it is not ar-

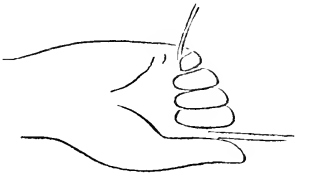


Fig. 47. Grecian.

chaic, but archaistic. Whether the work be genuine or spurious I am not competent to judge. I may venture to say, however, that the attitude of the shaft-hand is very inaccurate. However absurd the drawing of the hand often is in these early Greek releases, the artists have rarely failed to adjust the arrow correctly in relation to

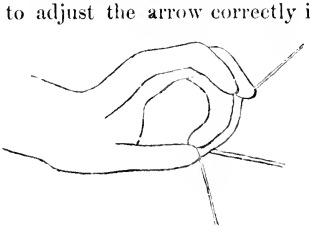


Fig. 48. Grecian.

the bend of the bow and the angle made by the string in tension. In this bas-relief of Herakles, however, the attitude of shooting is one of which no artist capable of making so robust and correct a body and pose would be guilty, and it certainly lends some weight to the supposition of Dr. Emerson as to the possible character of the work.

The accompanying figures are interesting as showing the conventional and even grotesque ways in which the arrow release is often represented on early Grecian vases. Figs. 47 and 48 are copied from *Weiner Vorlage Blätter*, Series D, Taf. IX, XII. Fig. 47 shows the hand reversed, with the thumb below instead of above. It is possible to shoot an arrow in this way but hardly probable that so awkward and unnatural an attitude would be taken. This release is intended to represent the tertiary release. Fig. 48 as drawn is an impossible release, though this release also may be intended to represent the tertiary release, the thumb being straight, and the arrow being held between

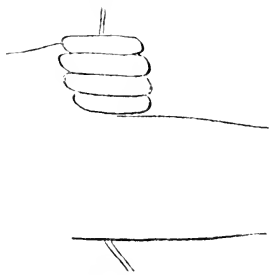


Fig. 49. Grecian.

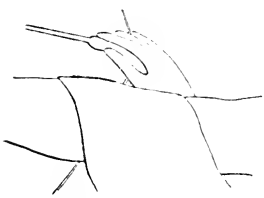


Fig. 50. Grecian.

the thumb and forefinger, while the second finger, and in Fig. 48 the second, third, and fourth fingers are on the string.

In *Monuments Inedits.*, Vol. I., Plate LI., is figured the famous Chalcidian or Achilles vase, supposed to have been made in the early part of the sixth century B. C. Here the archer is shown left-handed. Assuming the drawing to be correct, the release represents the archaic form (Fig. 49).

Another release figured in the same volume, Plate XX., may be intended to represent the tertiary release (see Fig. 50). On Plate L., Vol. II., of the same work is fig-

ured a Grecian vase of the fourth century B. C., on which are depicted two releases which are probably the tertiary form (Fig 51). On Plate XVIII. of the same volume is figured an archaic Etruscan vase on which a curious de-

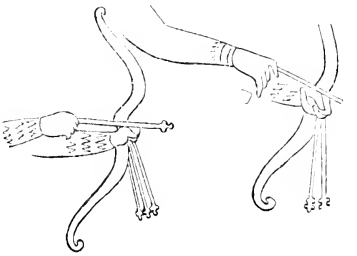


Fig. 51. Grecian.

lineation of an archer is given. The bow-hand is so well drawn that one is almost inclined to imagine that some mechanical device for releasing the arrow is intended by the curious representation of the shaft-hand (Fig. 52). Three other curious releases are shown in Figs. 53, 54 and

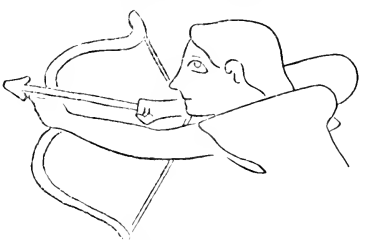


Fig. 52. Etruscan.

55, the latter copied from a Greek vase (black figures on red) supposed to be of the sixth century B. C. All these, though incorrectly represented, are probably intended for the tertiary release. Fig. 56 is copied from a figure given in *Auserlesene Vaserbilder*, representing a Greek vase of

the sixth century B. C. In this the archer's hand most certainly suggests the Mongolian release. It is true the thumb is not bent on the string, but it is bent with the second and presumably the first finger pressing against it.

Concerning ancient Persian releases, only two have fallen

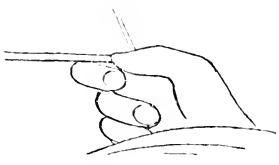


Fig. 53. Grecian.

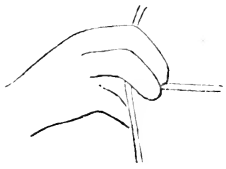


Fig 54. Grecian (bas-relief).

under my notice. One is preserved on a silver cup of the Sassanid Dynasty, fifth century B. C. This is figured in *Monuments Inedits.*, Vol. III., Plate 51. In this figure the bow is a typical Manchu. The release is unquestionably a variety of the Mongolian release, the second and

Fig. 55. Grecian.

Fig. 56. Grecian.

third fingers aiding the thumb, while the index finger is straight and inactive. The hand has attached to it a curious gear of leather, apparently held by a band about the wrist. Whether this suggests a finger- and thumb-

guard similar to that used by the Japanese it is difficult to determine. (Fig. 57.)

In the Journal of the Royal Asiatic Society of Bengal, Vol. VII., Part I., p. 258, 1883, is a communication from Major General A. Cunningham, entitled "Relics from Ancient Persia in Gold, Silver, and Copper." These objects were found on the northern bank of the Oxus. Judging from the coins, the author regards the deposit as having been made not later than 180 or 200 years B. C. Among the relics was a stone cylinder, upon which were represented two Persian soldiers capturing two Scythians. The representations of the hands are too imperfect for one to judge with any precision of the character of the release in-

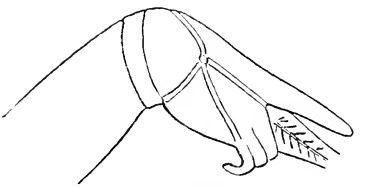


Fig. 57. Persian.

tended. The attitude of the hand in every case, however, suggests the Mongolian release. The bow is short, and of a form similar to the Manchu bow of to-day. It is interesting to notice that the Scythians are represented as shooting left-handed, and in this connection to recall the advice which Plato gives in regard to archery,—that both hands should be taught to draw the bow, adding that the Scythians draw the bow with either hand.

In regard to Chinese archery in ancient times, the classics of China abound in allusions to archery, and there can be no doubt that the release as practiced to-day is identical with the release practiced three thousand years

ago. The Analects of Confucius, the Doctrine of the Mean, and other ancient writings bear ample testimony to the high esteem in which this manly art was held.

In the Shi King, or book of ancient Chinese poetry (translation of Legge), the following allusions refer to the use of the thumb-ring, which was also called a thimble, and also a *pán chí*, or finger regulator.

"With archer's thimble at his girdle hung."

And again,—

"Each right thumb wore the metal guard."

Concerning Japanese archery methods in past times,

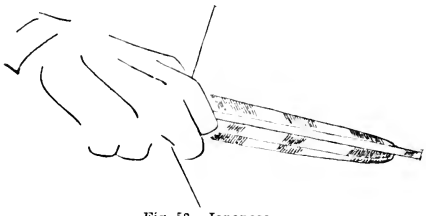


Fig. 58. Japanese.

what little evidence we have on the subject points to a Mongolian form of release. The archers have always formed a favorite study for the Japanese artist, and many details of the bow and arrow and attitudes of the archer may be got from old paintings and drawings. The representations of the hand in shooting, though often drawn conventionally, are easily interpreted as releasing the arrow after the Mongolian method. Fig. 58 is copied from a vigorous drawing, showing the attitude of the shaft-hand in the attitude of release. In the Shinto temple at Miyajima is a picture over two hundred years old, in which the archer's hand is shown in the attitude of the

Mongolian release. A picture of Tamiu, painted one hundred and fifty years ago and supposed to be a copy of a Chinese subject six or seven hundred years old, shows plainly the Mongolian release. In a picture by Keion, seven hundred years old, the archer is represented in the act of wetting with his tongue the tips of the first two fingers of his hand; and this certainly suggests the Japanese form of the Mongolian release.

Among the Emperor's treasures at Nara is a silver vessel supposed to be of the time of Tempei Jingo (765 A. D.), upon which is depicted a hunting-scene. Here the release, if correctly depicted, suggests the Mediterranean form. The bow is Mongoloid. The vessel is probably Persian: it is certainly not Japanese. The earliest allusions to Japanese archery are contained in "Kojiki, or Records of Ancient Matters," of which its translator, Mr. Basil Hall Chamberlain, says: "It is the earliest authentic literary product of that large division of the human race which has been variously denominated Turanian, Scythian, and Altäic, and even precedes by at least a century the most ancient extant literary compositions of non-Aryan India." These records take us back without question to the 7th century of our era. In this work allusion is made to the *heavenly feathered arrow*, to the *vegetable wax-tree bow* and *deer bow*, and also to the *elbow pad*. It is difficult to understand the purpose of the elbow pad in archery, assuming the same practice of the bow in ancient times as in present Japanese methods. It is difficult to believe that a pad on the elbow was needed to protect that part from the feeble impact of the string. If the pad was a sort of arm-guard surrounding the elbow, then one might surmise the use of a highly strung bow of Mongolian form held firmly and not permitted to rotate as in the Japanese style.

The peculiar twist given the bow by the Japanese archer is, so far as I know, unique in archery practice. In Siam, a bow of curious construction is used for throwing clay balls. The ball is held in a netting, the string of the bow is double, the bow-hand has the thumb braced vertically against the inside of the bow, so that it may not interfere with the flight of the ball. A peculiar twist is given the bow, so that the ball passes free from it.

I know of no record to show that the Japanese ever used a bow of this nature; in the Emperor's treasure-house at Nara, however, is preserved a curious bow nearly a thousand years old, and this is undoubtedly a bow used for throwing clay or stone balls. Instead of a netting to hold the ball there is a perforated leathern piece. This piece is adjusted to the cord a third way down the bow, at about the point from which the Japanese archer discharges the arrow. Whether the Japanese archer acquired this curious twirl of the bow to protect the feathers from rubbing against its side, or to escape the painful impact of the string, or, which is not improbable, acquired this novel twist from using the ball-throwing bow it is difficult to determine.

In regard to the release practiced by the various tribes in India, I have no information.

Through the courtesy of the lamented James Fergusson, I was permitted to examine his large collection of photographs of Indian Temples; and in a brief examination of these pictures I discovered a few releases in the sculptures. In the Peroor Temple near Coimbatore, an eight-armed God is represented as holding upright, between the first and second fingers of the right hand, an arrow. It is impossible to conjecture the form of release in this attitude; though, if the arrow were carried to the string in this position, the Mediterranean release would be suggested.

On the southwest face of the temple of Halabeed, Mysore, an archer is shown with the arrow already released; the attitude of the hand, however, suggests the Mediterranean form. In the Valconda, a small, ruined temple near Calamapoor, archers are shown having the tips of all the fingers on the string, in the same position as shown in the later Assyrian release; and this would indicate the secondary release.

These data are altogether too few and vague to determine the form or forms of release of these people.

Concerning ancient methods of archery in America, but little can be said. Probably the most reliable data are to be found in the few Mexican records which survived the shocking desecration by the Catholic Church at the time of the Conquest.[1]

An examination of the plates of Kingsborough's "Mexican Antiquities" reveals a number of hunters and warriors armed with bows and arrows. The figures at best are somewhat rudely drawn; those that are in action have the shaft-hand so poorly drawn that in most cases it is difficult to make out the release. In the few drawings in which the attitude of the shaft-hand is clearly shown, the tertiary release is probably indicated.

To Mrs. Zelia Nuttall Pinart I am indebted for tracings of archers from the *Atlas Duran*, Plate I., and *Mappe Quinatzin* I, Plate IV. These, though quite as ambiguous as those to be found in Kingsborough's, can only be interpreted as representing the tertiary release. In the latter

[1] The fiercely intolerant spirit of the representatives of the church is well illustrated by the language of a letter written by Zumarraga, the chief inquisitor of Mexico, to the Franciscan chapter at Tolosa, in January, 1531. The words are as follows: "Very reverend Father, be it known to you that we are very busy in the work of converting the heathen; of whom, by the grace of God, upwards of one million have been baptized at the hands of the brethren of the order of our Seraphic Father, Saint Francis; five hundred temples have been levelled to the ground, and more than twenty thousand figures of the devils they worshipped have been broken to pieces and burned."—*Examples of Iconoclasm by the Conquerors of Mexico*, by W. H. Holmes.

work, Plates 90 and 93 of Vol. II. show apparently a Mediterranean release; and were there no other reasons for believing that these people practiced the tertiary release, it might be assumed that the Mediterranean release was also practiced. The reasons are, first, that in every case the arrow is pulled to the breast or even lower; and, second, and of more importance, in every instance when the archer is shown with the right hand toward the observer, the arrow is below the bow-hand, whereas in every case when the archer is shown with the left hand towards the observer, the arrow is above the bow-hand. The bow is represented vertically, as in all rude and early figures; but the artist, not being able to represent the bow foreshortened and horizontal, has unconsciously indicated the attitude of the tertiary release by preserving the attitude of the bow in relation to the hand.

We have seen that the Mediterranean release has two forms, in one of which three fingers are brought into action; in the other only two fingers are so used. English authorities say that if one can accustom himself to draw the bow with two fingers, a better release is the result. While the difference between these two forms seems slight, as indeed it is, yet the practice to-day among European and American archers is to draw with three fingers. It was evidently not so universally the form in Europe a few centuries ago; for at this time, judging from the few examples we have seen, the archers are almost always depicted drawing with two fingers. It is true, the directions in the works of these early times as well as allusions to the subject state that three fingers on the string is the proper method of release. Yet the few sculptures, ivory carvings, etchings, manuscripts, drawings, etc., to which we have had access, almost invariably depict the two-fingered release.

It would be interesting to know whether the bow has

become stiffer in later years, requiring three fingers to bend it, or whether (as more probable) the fingers have become weaker, thus requiring more fingers to do the work.

It is interesting to find in these early works a uniformity in the method of release employed, and that the Saxon, Norman, Fleming, French, English, Scandinavian, and Italian practiced essentially the same release.

Hansard says (see the "Book of Archery," p. 77), "All representations of archers which occur in illuminated manuscripts of the thirteenth, fourteenth, and fifteenth centuries — and I have examined some scores of them — identify the ancient with the modern practice. The pen-and-ink drawings of John de Rous, a bowman as well as contemporary biographer of that Earl of Warwick who, during the Wars of the Red and White Roses, was the setter up and destroyer of many kings, will furnish amusement and information to the curious. The necessary slight inclination of the head and neck — 'this laying of the body in the bow,' the drawing with two and with three fingers — are there correctly delineated. They may be found among the manuscripts in the British Museum."

According to Hansard, Ascham ordered the shooting-glove to be made with three fingers, "and when Henry the Fifth harangued his troops previous to the battle of Agincourt, he endeavoured to exasperate their minds by dwelling on the cruelties in store for them. Addressing his archers, he said the French soldiers had sworn to amputate their three first fingers, so that they should never more be able to slay man or horse."[1]

[1] Meyrick, in his famous work on "Ancient Armour" (Vol. I., p. 9), in speaking of the origin of the bow in England, says: "The bow as a weapon of war was certainly introduced by the Normans; the Saxons, like the Taheite at the present day, used it merely for killing birds. On this account, in the speech which Henry of Huntington puts into the Conqueror's mouth before the battle, he makes him stigmatize the Saxon as 'a nation not even having arrows.'"

The earliest figure I have met with, illustrating archery in England, was copied from the Saxon manuscripts in the Cotton Library. These manuscripts are of the eighth century. If the wood-cut contained in Strutt's "Sports and Pastimes" is correct, then the attitude of the hands shows distinctly the three-fingered Mediterranean release. The bow is short and thick, and has a double curve, something like the Roman bow, from which indeed it might naturally have been derived.[1]

The following examples have come under my notice in a very hasty and imperfect survey of the field, principally derived from books, engravings, and ivory carvings, reproductions, etc., in museums.

The celebrated Bayeux Tapestry, a copy of which may be seen at the South Kensington Museum, represents the archers in the attitude of the two-fingered Mediterranean release, though a few are shown using three fingers. Also the following show the two-fingered form of the Mediterranean release without exception: a fresco in Kumla Church, Vestmanland Co., Sweden, 1492; a sculptured figure in wood by Albrecht Darer, figured in Sommerard's "Arts of the Middle Ages" (5th Series, Plate XXVII.), also in the same work (10th Series, Plate XXV.); a chess piece in ivory supposed to be of the tenth or eleventh century; in Meyrick's "Ancient Armour" (Plate VIII., Vol. I.), a figure of a Norman of the eleventh century, on the doorway of the Cathedral of Amiens, a cast of which may be seen at the Trocédero Museum; and, finally, in the Boston Museum of Fine Arts are a number of Florentine engravings of the early half of the fifteenth century, and these in every case represent in the

[1] It may be well to state here that opportunity has not permitted an examination of sources for early Roman releases. On Trajan's column a few releases are shown, and these are of the Mediterranean form.

clearest manner the two-fingered variety of the Mediterranean release. A curious form of the Mediterranean release is shown on the door of the Church of the Madeleine at Vezelay, a cast of which is to be seen at Trocédero Museum. In this release the archer has all four fingers on the string, the arrow being held between the second and third fingers. I had supposed that this was a mistake of the artist, as indeed it may have been, but Col. James Stevenson, in describing to me the methods of release among the Navajo Indians of North America, illustrated a release identical with this four-fingered variety.

In conclusion, it is interesting to observe that all the releases thus far described have been practiced from the earliest historic times. Each release with the exception of the primary release, which admits of no variation, has one or more varieties. The secondary release may have the second finger, or the second and third fingers on the string. Some forms of this release in India and Assyria show all the fingers on the string; it is hardly probable, however, that these are correctly represented. The tertiary release may have the first and second, or the first, second, and third fingers on the string. The Mediterranean release may be effected with two or three fingers, and in two instances all the fingers, on the string. The Mongolian release may have the assistance only of the first finger as in the Chinese and Manchu, or the first and second fingers as in the Korean and Japanese, — or, if rightly interpreted, the early Persian form, with the second and third only aiding the thumb; and if the Mongolian release described on page 161 be an established form, then we have here a mixture of Mongolian and secondary.

The persistence of a release in a people is well illustrated in the case of the Aino. For centuries the Ainos have

battled with the Japanese, and must have been mindful of the superior archery of their enemies: indeed on all hands, with the exception possibly of the Kamtschadals at the north, the Ainos have been surrounded by races practicing the Mongolian release, and yet have adhered to their primitive methods of shooting.

The releases vary in their efficiency and strength. The two strongest and perhaps equally powerful releases are the Mediterranean and Mongolian; and it is interesting to note the fact that the two great divisions of the human family who can claim a history, and who have been all dominant in the affairs of mankind, are the Mediterranean nations and the Mongolians. For three or four thousand years, at least, each stock has had its peculiar arrow-release, and this has persisted through all the mutations of time to the present day. Language, manners, customs, religions have in the course of centuries widely separated these two great divisions into nations. Side by side they have lived; devastating wars and wars of conquest have marked their contact; and yet the apparently trivial and simple act of releasing the arrow from the bow has remained unchanged. At the present moment the European and Asiatic archer, shooting now only for sport, practice each the release which characterized their remote ancestors.

Want of material will prevent more than a passing reference to a peculiar practice of archery which Moseley alludes to as pedestrial archery. It is a matter of common record that in widely separated parts of the world, as South America, China, and Africa, the archer uses his feet in drawing the bow. In an "Essay of Archery" by Walter Michael Moseley, 1792, the writer says: "It is recorded by ancient writers that the Ethiopians draw the bow with the feet;" and again, Xenophon speaking of the Caducians says: "They had bows which were three cubits long, and

arrows two cubits. When they made use of these weapons, *they placed their left foot on the bottom of the bow*, and by that method they drove their arrows with great violence," etc.

It is recorded of the Arabians that they used their bows in the manner above alluded to, by the help of the foot. The release in these cases must be of a most vigorous character; and when in some accounts the archer is represented as resting on his back, with both feet bracing against the bow, the string is probably clutched with both hands, after the manner I have provisionally called the archaic release.

In the following classified list of releases and the people who practice them, it is shown in a general way that the primary, secondary, and tertiary releases are practiced by savage races to-day, as well as by certain civilized races of ancient times; while the Mediterranean and Mongolian releases, though originating early in time, have always characterized the civilized and dominant races. The exceptions to this generalization are curious: the Little Andaman islanders practicing the Mediterranean release, and the inhabitants of the Great Andaman Island practicing the tertiary release, are an illustration. The fact that the various groups of Eskimo practicing the Mediterranean release, and so far as I know being the only people who have designed a distinct form of arrow for this method, is exceedingly curious. Mr. John Murdock, who is engaged in a careful study of the Eskimo, has expressed to me a surmise that certain arts of the Eskimo may have been derived from Greenland through Scandinavian colonists; and this might explain the anomaly.

It may be shown that in tribes in which the bow is but little used, and then only for small birds and game, the release is weak or irregular. The data, however, are altogether too few to establish any conclusions respecting this.

CLASSIFIED LIST OF TRIBES AND NATIONS REFERRED TO IN THIS PAPER.

RECENT.

PRIMARY RELEASE.

Savage.

Ainos of Yezo.	observed.
Demerara, S. A.	published.
Navajo, N. A.	reported.
Chippewa, N. A.	"
Micmac, Canada.	"
Penobscot, N. A.	observed.
Ute, N. A. ?	photograph.

SECONDARY RELEASE.

Savage.

Ottawa, N. A.	observed.
Zuñi, N. A.	"
Chippewa, N. A.	reported.

TERTIARY RELEASE.

Savage.

Omaha, N. A.	observed.
Sioux, N. A.	reported.
Arapahoes, N. A.	"
Cheyennes, N. A.	"
Assiniboins, N. A.	"
Comanches, N. A.	"
Crows, N. A.	"
Blackfeet.	"
Navajos, N. A.	"
Great Andaman Islander	published.

Civilized.

Siamese.	observed.

MEDITERRANEAN RELEASE.

Civilized.

European Nations.	observed and published.

Savage.

Point Barrow Eskimo.	reported.
Cumberland Sound Eskimo.	published
East Cape Siberia Eskimo.	"
Little Andaman Islander.	"

MONGOLIAN RELEASE.

Civilized.

Manchu soldier, China.	observed.
Cantonese, China.	"
Korean.	"
Japanese.	"
Turks.	published.
Persians.	"

IRREGULAR RELEASE.

Temiangs, Sumatra.	observed.

ANCIENT.

PRIMARY RELEASE.

Civilized.

Assyrian, early.
Egyptian.
Grecian?

SECONDARY RELEASE.

Civilized.

Assyrian, later.
India?

TERTIARY RELEASE.

Civilized.

Egyptian.
Grecian.
Mexican?

MEDITERRANEAN RELEASE.

Civilized.

Assyrian, later.
Egyptian, early.
Arabian.
Indian.
Roman.

Middle Ages.

English.
French.
Norman.
Fleming.
Saxon.
Swede.
Florentine.

MONGOLIAN RELEASE.

Civilized.

Chinese.
Scythian.
Persian.
Egyptian. ?
Greek. ?

ARCHAIC RELEASE?

Civilized.

Ancient Greek.

It is hardly necessary to call attention to the importance of a more systematic study of the methods of archery and paraphernalia of the archers than has yet been done. I would point out the necessity of observing greater care in copying drawings, rock-inscriptions, frescos, bas-reliefs, etc., as to the minor details,—such as the position of the hand, the shape and character of the ends of the bow and arrow, and the shape of the feathers; also the possibility and importance of identifying among ancient objects and drawings arm-guards, thumb-rings, arrow-rests, etc. Travellers and explorers ought also not only to observe the simple fact that such and such people use bows and arrows, but they should accurately record, (1) the attitude of the shaft hand; (2) whether the bow is held vertically or horizontally; (3) whether the arrow is to the right or to the left of the bow vertical; and (4), of which no comment has been made in this paper, whether extra arrows are held in the bow-hand or shaft-hand. The method of bracing the bow is of importance also.

The remarkable persistence of certain forms of arrow-release among various nations leads me to believe, that, in identifying the affinities of past races, the method of using the bow may form another point in establishing or disproving relationships. By knowing with more certainty the character and limitation of the forms of arrow-release,

another clew may be got as to the date and nature of fragments of sculpture representing the hand. The peculiar attitude of the archer might lead to the interpretation of armless statues.

The author would be very grateful for any information regarding the methods of arrow-release of tribes and peoples. Particularly would he desire the release as practiced by the Veddahs of Ceylon, the Hill tribes of India, the tribes of Africa, South America, and especially the Fuegans. Indeed, any information regarding the methods of arrow-release in any part of the world would be acceptable. Such material in the shape of descriptions, photographs, drawings, and if possible specimens of bows and arrows, may be sent to the author, Peabody Academy of Science, Salem, Mass., U.S.A., for which full credit will be given in a future publication on this subject.

In addition to those already mentioned in these pages to whom the author is under obligations, he would mention Gen. Charles A. Loring, Mr. Edward Robinson, Prof. Otis T. Mason, Rev. W. C. Winslow, Mr. T. F. Hunt, Dr. W. S. Bigelow, Prof. John Robinson, Mr. S. R. Koeller, and Prof. E. F. Fenollosa, who have in various ways rendered him kind assistance.