

BULLETIN
OF THE
American Museum of Natural
History.

Vol. X, 1898.

NEW YORK :
Published by order of the Trustees.
1898.

WM. C. MARTIN PRINTING HOUSE

No. 111 John Street

New York

BULLETIN
OF THE
AMERICAN MUSEUM OF NATURAL
HISTORY.

Volume X, 1898.

NEW YORK:
PUBLISHED BY ORDER OF THE TRUSTEES.

1898.

COMMITTEE OF PUBLICATION.

R. P. WHITFIELD.

J. A. ALLEN.

HENRY FAIRFIELD OSBORN.

WM. BEUTENMÜLLER.

F. W. PUTNAM.

EDITOR OF BULLETIN.

J. A. ALLEN.

CONTENTS OF VOLUME X.

	PAGE
Title-page	i.
Committee of Publication	ii.
Contents	iii.
List of Illustrations	v.
Dates of Publication of Authors' Separates	vii.
List of New Genera, Species and Subspecies	viii.
ART. I.—The Huichol Indians of Mexico. By CARL LUMHOLTZ. (Plates I and II, and 1 text figure.).....	
	I
II.—Notes on Birds observed at Jalapa and Las Vigas, Vera Cruz, Mexico. By FRANK M. CHAPMAN. (Plate III.)	
	15
III.—Notes upon Fishes received at the New York Aquarium, with Description of a New Species of Snapper from Bermuda. By TARLETON H. BEAN.....	
	45
IV.—A Complete Skeleton of <i>Teleoceras fossiger</i> . Notes upon the Growth and Sexual Characters of this Species. By HENRY FAIRFIELD OSBORN. (Plates IV and IVA.).....	
	51
V.—Marked Human Bones from a Prehistoric Tarasco Indian Burial Place in the State of Michoacan, Mexico. By CARL LUMHOLTZ and ALEŠ HRDLÍČKA. (Plates V–IX, and 4 text figures.).....	
	61
VI.—A Complete Skeleton of <i>Coryphodon radians</i> . Notes upon the Locomotion of this Animal. By HENRY FAIRFIELD OSBORN. (Plate X, and 2 text figures.).....	
	81
VII.—The Extinct Camelidæ of North America and Some Associated Forms. By J. L. WORTMAN, M.D. (Plate XI, and 23 text cuts.).....	
	93
VIII.—Descriptions of New Mammals from Western Mexico and Lower California. By J. A. ALLEN.....	
	143
IX.—Remounted Skeleton of <i>Phenacodus primævus</i> . Comparison with <i>Euprotogonia</i> . By HENRY FAIRFIELD OSBORN. (Plate XII, and 4 text figures.).....	
	159

	PAGE
X.—Notes on Mexican Fishes obtained by Dr. Carl Lumholtz. By TARLETON H. BEAN.....	165
XI.—Evolution of the Amplypoda. Part I. Taligrada and Panto- donta. By HENRY FAIRFIELD OSBORN. (With 29 text figures.)	169
XII.—Additional Characters of the Great Herbivorous Dinosaur <i>Camarasaurus</i> . By HENRY FAIRFIELD OSBORN. (With 13 text figures.).....	219
XIII.—Revision of the Species of <i>Euchloë</i> inhabiting America, north of Mexico. By WILLIAM BEUTENMÜLLER. (Plates XIII and XIV.)	235
XIV.—Revision of the Chickarees, or North American Red Squirrels (Subgenus <i>Tamiasciurus</i>). By J. A. ALLEN.....	249
XV.—Descriptions of Three New Forms of Pocket Mice from the Mexican Border of the United States. By EDGAR A. MEARNS.....	299
XVI.—A Study of the Vertebrate Fauna of the Hudson Highlands, with Observations on the Mollusca, Crustacea, Lepidoptera, and the Flora of the Region. By EDGAR A. MEARNS, Assistant Surgeon U. S. Army.....	303
XVII.—Descriptive Catalogue of the Bombycine Moths found within Fifty Miles of New York City. By WILLIAM BEUTEN- MÜLLER. (Plates XV-XXIII.).....	353
XVIII.—Nomenclatorial Notes on Certain North American Mammals. By J. A. ALLEN.....	449
XIX.—Notice of a Remarkable Specimen of the West Indian Coral <i>Madrepora palmata</i> . By R. P. WHITFIELD. (Plate XXIV.)	463

LIST OF ILLUSTRATIONS.

Text Figures.

	PAGE
Sectional view of Huichol Distillery	12
Pottery dish with human skull and sculptured stone.....	64
Head cut from volcanic rock, front and side views.....	64
Section of humerus, from Tarasco Indian burial place	72
<i>Coryphodon hamatus</i> , skeleton as restored by Marsh.....	88
Diagrams of angles between the astragalo-tibial and astragalo-navicular facets in <i>Ursus</i> , <i>Pantolambda</i> , <i>Coryphodon</i> , <i>Uintatherium</i> and <i>Elephas</i>	89
<i>Leptoreodon marshi</i> , side view of skull.....	95
<i>Bunomeryx elegans</i> , crown view of upper and lower teeth....	100
<i>Protylopus petersoni</i> , side view of skull.....	105
“ “ crown view of lower teeth.....	106
“ “ vertebrae.....	107
“ “ left hind foot, femur, tibia and fibula.....	109
<i>Poebrotherium wilsoni</i> , side view of skull	111
“ “ fore and hind foot, humerus, ulna and radius, and femur and tibia.....	112
<i>Gomphotherium sternbergi</i> , side view of skull.....	114
“ “ humerus, ulna and radius.....	116
“ “ femur, tibia and fibula.....	117
“ “ hind foot.....	117
“ <i>cameloides</i> , lower jaw, side view	118
“ “ upper teeth, crown surface.....	118
“ “ humerus	118
“ “ ulna and radius.....	119
“ “ fore foot.....	119
<i>Procamelus gracilis</i> , top and under view of skull.....	125
<i>Camelus americanus</i> , lower jaw, side view.....	133
<i>Auchenia lama</i> , crown view of lower teeth.....	134
“ “ crown view of upper teeth.....	135
<i>Phenacodus primævus</i> , skeleton as originally mounted	159
“ “ vertebral column	161
“ “ skeleton, in standing position.....	162
<i>Euprologonia puercensis</i> , mounted skeleton.....	163
Laramie Trituberculatus, molar types	171
<i>Pantolambda cavirictus</i> , lower jaw, and crown view of upper and lower molars.....	172
Amblypoda, diagrams showing evolution of lower molars.....	173

	PAGE
<i>Coryphodon testis</i> , crown view of upper molars.....	174
Creodont carpus (<i>Dissacus carnifex</i>).....	174
<i>Coryphodon testis</i> , pes and manus.....	175
<i>Pantolambda cavirictus</i> , side, lower and upper views of skull.....	179
" <i>bathmodon</i> , side view of skull.....	181
" " skeleton.....	183
" " astragalus, metacarpal iii, and phalanges.....	184
" " bones of fore and hind limbs.....	185
" " carpus and tarsus.....	187
" <i>cavirictus</i> , right pes, from above.....	188
<i>Coryphodon testis</i> , skull, side view.....	189
" typical upper molars, eight species.....	190
" typical lower molars, eight species.....	192
" upper and lower canines, four species.....	193
<i>Pantolambda bathmodon</i> , <i>Coryphodon wortmani</i> and <i>C. testis</i> , skulls, comparative views.....	194
<i>Coryphodon testis</i> , mounted skeleton.....	195
" <i>elephantopus</i> , view of occiput and transverse section of skull..	196
" side, superior and sectional views of skull.....	200
" <i>testis</i> , skull, side and front views.....	203
" " crown view of upper and lower molars.....	204
" " vertebral column.....	205
" <i>lobatus</i> , back view of pelvis.....	206
<i>Coryphodon armatus</i> , crown view of upper molars.....	209
" <i>ventanus</i> , foot structure.....	211
" <i>wortmani</i> , side view of skull.....	212
" <i>singularis</i> , superior and side views of pes.....	215
Diagram of angles of tibio-astragalar with astragalo-navicular facets in <i>Ursus</i> , <i>Pantolambda</i> , <i>Coryphodon testis</i> , <i>Uintatherium</i> and <i>Elephas</i> ..	216
<i>Dromæus</i> , cervicals 13 and 14, and dorsals 1 and 2.....	221
<i>Camarasaurus</i> , mid-dorsal vertebra.....	223
" fifth caudal vertebra.....	224
" first " ".....	225
" first, fifth, eighth, ninth and twelfth caudals.....	226
<i>Brontosaurus excelsus</i> , fourth caudal vertebra.....	226
<i>Apatosaurus ajax</i> , three coalesced sacrals.....	228
<i>Atlantosaurus montanus</i> , three coalesced sacrals.....	228
<i>Brontosaurus excelsus</i> , five coalesced sacrals.....	228
" " posterior cervical vertebra.....	229
<i>Apatosaurus ajax</i> , dorsal vertebra.....	230
<i>Camarasaurus supremus</i> , anterior dorsal vertebra..	231
" " an anterior dorsal vertebra.....	232
<i>Brontosaurus excelsus</i> , dorsal vertebra.....	232
<i>Amphicælias altus</i> , posterior dorsal.....	232

Plates.

- I.—Huichol Indian in ordinary dress.
- II.—Huichol distillery.
- III.—Nest of *Platysaris aglaia* Lafr.
- IV.—Mounted skeleton of *Teleoceras fossiger*.
- IVA.—Male and female skulls of *Teleoceras fossiger*.
- V.—Tarasco burial jar.
- VI–VIII.—Marked human bones from a Tarasco Indian burial place.
- IX.—Artificial perforations to the medulla of the bones.
- X.—Mounted skeleton *Coryphodon radians*.
- XI.—Metapodials of extinct Cameloids.
- XII.—Mounted skeleton of *Phenacodus primævus*.
- XIII and XIV.—Butterflies of the genus *Euchloë*.
- XV–XXIII.—Bombycine moths.
- XXIV.—*Madrappora palmata* Lamark.

DATES OF PUBLICATION OF AUTHORS'
SEPARATES.

Art. I, Jan. 21 ; Art. II, Feb. 24 ; Art. III, Feb. 25 ; Art. IV, March 18 ;
 Art. V, March 31 ; Art. VI, April 4 ; Art. VII, April 9 ; Art. VIII,
 April 12 ; Art. IX, May 6 ; Art. X, May 7 ; Art. XI, June 3 ; Art. XII,
 June 4 ; Art. XIII, June 24 ; Art. XIV, July 22 ; Art. XV, Aug. 31 ;
 Art. XVI, Sept. 9 ; Art. XVII, Oct. 14 ; Art. XVIII, Nov. 10 ; Art.
 XIX, Nov. 15.

The edition of authors' separates from the present volume was 250, of which 100 were for the authors, 100 for the Library exchange list, and 50 were placed on sale with the Librarian. Of many of the articles an additional 100, in some cases 200, was ordered by the authors.

The distribution of the Bulletin in signatures was discontinued with the close of Vol. VIII.

LIST OF GENERA, SPECIES AND SUBSPECIES DESCRIBED OR RENAMED IN THIS VOLUME.

GENERA.

	PAGE
<i>Leptoreodon</i> Wortman.....	95
<i>Bunomeryx</i> Wortman.....	97
<i>Protylopus</i> Wortman.....	104
<i>Synconodon</i> Osborn.....	171
<i>Ectonocodon</i> Osborn.....	171
<i>Protolambda</i> Osborn.....	172

SPECIES AND SUBSPECIES.

<i>Neomaxis hastingsi</i> Bean.....	45
<i>Leptoreodon marshi</i> Wortman.....	95
<i>Bunomeryx montanus</i> Wortman.....	97
" <i>elegans</i> Wortman.....	100
<i>Protylopus petersoni</i> Wortman.....	104
<i>Gomphotherium cameloïdes</i> Wortman.....	117
<i>Phauchenia minima</i> Wortman.....	127
<i>Camelus americanus</i> Wortman.....	133
<i>Marmosa sinaloæ</i> Allen.....	143
<i>Lepus peninsularis</i> Allen.....	144
" <i>cerrosensis</i> Allen.....	145
" <i>arizonæ confinis</i> Allen.....	146
<i>Thomomys fulvus anitæ</i> Allen.....	146
" " <i>martirensis</i> Allen.....	147
" <i>atrovarius</i> Allen.....	148
<i>Perognathus pernix</i> Allen.....	149
<i>Neotoma sinaloæ</i> Allen.....	149
" <i>arenacea</i> Allen.....	150
" <i>anthonyi</i> Allen.....	151
<i>Peromyscus eremicus propinquus</i> Allen.....	154
" <i>cedrosensis</i> Allen.....	154
" <i>cineritius</i> Allen.....	155
" <i>geronimensis</i> Allen.....	156
" <i>exiguus</i> Allen.....	157
" <i>dubius</i> Allen.....	157
<i>Synconodon sexicuspis</i> Osborn.....	171
<i>Ectoconodon petersoni</i> Osborn.....	171
<i>Protolambda hatcheri</i> Osborn.....	172

	PAGE
<i>Coryphodon ventanus</i> Osborn.....	210
“ <i>wortmani</i> Osborn	212
“ <i>singularis</i> Osborn	214
<i>Euchloë creusa</i> var. <i>elsa</i> Beutenmüller.....	242
“ <i>lotta</i> Beutenmüller	243
<i>Sciurus hudsonicus baileyi</i> Allen	261
“ “ <i>ventorum</i> Allen.....	263
“ “ <i>streatori</i> Allen	267
“ <i>douglasii cascadiensis</i> Allen.....	277
“ <i>fremonti neomexicanus</i> Allen.....	291
<i>Perognathus pacificus</i> Mearns.....	299
“ <i>longimembris bangsi</i> Mearns	300
“ (<i>Chatodipus</i>) <i>eremicus</i> Mearns.....	300
<i>Sciurus douglasii albolimbatus</i> Allen.....	453
“ <i>wagneri</i> Allen.....	453

BULLETIN
OF THE
AMERICAN MUSEUM OF NATURAL HISTORY.

Volume X, 1898.

Article I.—THE HUICHOL INDIANS OF MEXICO.

By CARL LUMHOLTZ.

PLATES I AND II.

My third and latest expedition to Mexico, where I was sent by the American Museum of Natural History, New York, in the spring of 1894, mainly to investigate the native tribes there, proved rich in scientific results, and lasted until the spring of 1897. During this period I spent about ten months among the Cora and the little-known Huichol Indians, by far the greater part of the time being devoted to the latter tribe. Before my departure for the field, the Governor of the State of Jalisco, Mexico, had told me of this interesting tribe. When I expressed to him my desire of finding primitive people in Mexico, he at once said, "You will find in a corner of this very State absolute savages, who wear their hair long, and refuse to pay taxes to the government. Once in a while they come in here to Guadalajara to see me, and sleep in the courtyard of the Palacio, which they seem to consider as their house."

The very name of this tribe is scarcely known outside of the State in which they live, and even within this extensive territory they are known only in parts not very remote from their homes. So great an authority as Manuel Orozco y Berra, in his '*Carta Etnográfica de México*,' has nothing more to say about this tribe

[*February, 1898.*]

[1]

1

than the following: "Theirs is a language of which we know very little. We remember having read that in a vague way it is made a dialect of the Mexican, and that it is thought that the Huichols are the remnants of the ancient Cuachichiles. We do not accept nor contradict this, because we have no dates. The Huichol language still remains to be classified by us. It is spoken in Santa Catarina, San Sebastian, San Andrés Coamiat, and Soledad y Tezompan, belonging to Colotlan."

This, in connection with the meagre information furnished by Don Francisco Pimentel, is virtually the only knowledge we have hitherto had concerning this tribe. I have heard that a small vocabulary has been published by one Mr. Landa in Pachuca; and a few rather unimportant facts may be found on page 321 of the first volume of Captain G. F. Lyon's 'Journal of a Residence and Tour in the Republic of Mexico in the Year 1826.'

It was with considerable interest, therefore, that I looked forward to meeting this almost wholly unknown tribe. After having spent two months among the Coras of the Sierra del Nayarit, I made an entrance into the country of the Huichols on the east, and, in spite of much opposition from these Indians, succeeded in conquering all obstacles in my way. In order to overcome their prejudice against me, on my arrival at the pueblo of San Andrés Coamiata I discharged all my men, who were Mexicans, and remained alone among the Indians. The Huichols look upon all strangers with much disfavor; and their feeling against me was so strong that the 'alcalde' of Santa Catarina, the capital, had even made threats on my life, should I ever go there. Gradually I learned the songs that the shaman was singing in the temple at the feast for making rain, thus breaking the hitherto insurmountable barrier between them and me; and by degrees I gained their confidence to such an extent that my stay in this tribe, although attended with many privations, was very fruitful in results. I purpose here to make some preliminary remarks concerning this interesting tribe, pending a detailed report to be issued later.

The name of the tribe is *Vĩ-rá-ri-ka*, in the western part of the country pronounced *Vĩ-sjá-li-ka*,¹ which means 'prophets' (Sp.

¹ The *tilde* over an *l* (*l̃*) indicates that the *l* is to be pronounced thick, almost approaching an *r* (pronounced with the tip of the tongue).

adivinos). The Mexicans call them 'los Huicholes,'—a corruption of the tribal name. Their number to-day is about four thousand, and they live in a mountainous country, difficult of access, in the northwestern part of the State of Jalisco, on a spur of the great Sierra Madre. This range runs in a northerly and southerly direction, parallel to Sierra del Nayarit, both Sierras forming the southern part of Sierra Madre del Norte, which ends at the Rio Alica (also called Rio Santiago, and by other names at different points on its course). The country is well watered, being traversed from north to south by a river, Rio Chapalagana, which runs at the bottom of a mighty, deep valley, a great many small affluents forming as many side valleys. While very narrow and steep at the bottom, the valley gradually broadens out, the sides rising to a height of from eight to nine thousand feet. The country thus consists of two parallel ridges and the valley between, the top of the ridges being covered with immense pine forests, the abode of numerous deer. Down in the little steep and mountainous side valleys, on the borders of the river, the climate is tropical, and sugarcane is raised on a small scale for home use. On the pine-clad heights the Indians are not generally found living; most of the ranches being situated at a moderate elevation above the sea, dispersed all over the district, in numerous small valleys.

The northern part of the country, around the pueblos of Tezompa and Soledad, is not so mountainous, and therefore has already been occupied by the Mexicans. The southern part, from the ranch Ratontita southwards, presents the same natural features as the northern; but the Huichols here still jealously keep the Mexicans out. It is probably only a matter of time, however, before this section too will become Mexicanized. Mexicans have also encroached on the outskirts of the Huichol country, towards the east and west, on both slopes of the Sierra.

All that is left, therefore, of the country owned solely by the Huichols, is mainly the central part. Here the population is fairly safe from advancing civilization, on account of the ruggedness of the country and its difficulty of access. It would hardly pay for white men to settle here, because of the small extent of country suitable for cultivation by the plough. I should estimate the present territory of the Huichols to be about forty miles long by

from twenty to twenty-five broad. This, however, gives no adequate idea of the length of time required to traverse this country of precipitous hillsides and mountain gorges.

The Indians raise corn, beans and squashes on a moderate scale. On account of the mountainous character of the land, ploughing is not resorted to, except in a few places; the old-fashioned Indian way of cutting down brush, burning it, and then tilling the ground, being in vogue. This way of cultivating, which is still used among several tribes in Mexico, is called in Spanish *coamilear*, and the field is called *coamil*.

There is generally an abundance of rain from July till November; but as so much of the corn is planted on the steep sides, where the water quickly dries up, the amount of water needed for cultivation is very great.

The Huichols have a tradition that they originated in the south, got lost underneath the earth, and came forward again in the east, in the country of the *híkuli* (Sp. *peyote*), which is the central mesa of Mexico, near San Luis Potosi. They, and their western neighbors the Coras, are related in regard to language, religion and customs. Many of their myths are similar. Nayarit, the great place of worship of the Coras, named Tonati by the chroniclers, is also the place of worship of the Huichols, and is called by them Sa-kai-mó-ka, this being the name of an idol of the setting sun, which stands at this high point of Sierra del Nayarit, "looking towards Mexico." In character the two tribes differ in that the Coras are unusually brave, while the Huichols are cowards, preferring assassination to open war. The Huichols do not like the Coras, because they are "serpents;" and the two tribes rarely have transactions with each other, although sometimes we find them intermarrying on the border.

It seems to be the accepted opinion that the country of the Huichols is included, with that of the Coras, under the term "Nayarit," and that the boundaries of Nayarit, or the "Province of Nuevo Toledo," as it was called, were Acaponeta in the west and Colotlan in the east. Thus the conquest of the Huichol country should have been accomplished at the same time as that of the Coras, namely in 1722. It seems hardly probable that the Huichols should not have been at least partly conquered before

that time by Spaniards coming from the east, more especially since they are not such warriors as are the Coras. This opinion is confirmed by a manuscript which I came across on my last expedition, according to which pueblos were formed in the eastern part of the Huichol country about the middle of the seventeenth century.

Franciscan missionaries converted them nominally to Christianity, founding the pueblos of Tezompa, Soledad, San Andrés Coamiata, Santa Catarina, and San Sebastian, all on the eastern side of the river except San Andrés Coamiata, which lies on a plain in the sierra on the west. The pueblo of Guadalupe y Ocotan is of later origin, the district surrounding it having previously belonged to San Andrés Coamiata. The two first-mentioned pueblos are possessed at present, as stated above, by the Mexicans. In the country of the Huichols there are to-day no priests, and there is probably no tribe in Mexico where the ancient beliefs have been so well maintained as there. Their exterior conditions have been somewhat altered by the introduction of cattle and sheep. Cattle are now the favorite animals for sacrifice at the feasts for making rain during the dry season.

The Huichols (see Plate I) are of medium height, or slightly over. At the pueblo of San Andrés, out of 43 men measured, 40 per cent. were below 1.63 metres, 30 per cent. above 1.68 metres, and 30 per cent. between these two figures, giving an average height of 1.65 metres. This corresponds, according to Dr. Hrdlička, with the heights of living Huichols, as calculated from measurements of the bones of Huichol skeletons. They are a healthy people, very emotional, being easily moved to laughter or to tears, and they are imaginative and excitable. Young people show affection in public, kissing or caressing each other. They are rather kind-hearted, and not inhospitable when having confidence in one; but they are avaricious, and the Mexican *peso* goes a long way in gaining their favor. As to regard for truth, they are absolutely wanting in that respect, and their word can never be depended upon. They are also very thievish, although they never stole anything from me.

On the western side of the river, as well as in the pueblo of Guadalupe y Ocotan, which is on the eastern side, towards the

south, the hair is worn long and flowing; but on the eastern side it is formed into a queue, interbraided, and tied around towards the end, with a colored ribbon. In all cases a narrow hair-ribbon is bound round the head.

The women weave blankets, tunics, girdles and hair-ribbons of ancient designs from wool. Cotton cloth, or *manta*, bought from Mexican stores, is gradually taking the place of woollen stuffs, as it is cheaper, and gives the women less trouble to make up. The women are clever at embroidery, with which they adorn both their own dress and that of the men.

The Huichols live mostly in circular houses (*i-kt'*) made from loose stones, or from stone and mud, and covered with thatched roofs. Their temples (*to-kt'-pa*), which are devoted to various gods, are of similar shape, but much larger, having their entrance toward sunrise. Outside of the door is an open space surrounded by small god houses (*sjí-ñi-ki*), rectangular in shape, and covered with gabled and thatched roofs. The entrance to the *sjí-ñi-ki* faces the open place in front of the temple. Such small god houses may also frequently be found in the forests, and are sometimes circular in form. There are nineteen temples in the country, and although one may generally find ranches near them, still it is only at the time of the feasts that the population of the district congregates there, officials and their families camping in the small god houses. The principal temple of the country is at the pueblo of Santa Catarina, the ancient name of which is To-a-pú-ñi, a mountain in the neighborhood. It is devoted to the principal god, Ta Té-wa-ñi, the god of fire. Idols are never found in the temples, but are hidden away in remote caves, or in some special sacred small edifice made for the purpose, either round or rectangular.

There are a great many sacred caves devoted to various gods. These generally contain some little spring or pool which makes the cave sacred. Such pools or springs, which are called *ku-tsá-ñi*, are also found in various parts of the country outside of caves; and the water is used for religious purposes, that from a few of them being thought beneficial to children, while a salutary influence upon human beings in general is attributed to that of most of them. The water is used both internally and externally. There is one cave near Santa Catarina where, once a year, every Huichol

must take a bath. The water from some *ku-tsd-lā* is brought in gourds to the temple for the feasts, where people both drink a little of it and wash their heads with it.

The Huichol spends a great part of his life at ceremonies and feasts. From May to August, that is to say the dry and part of the wet season, there are frequent feasts for making rain. During the wet season, should it stop raining only for two or three days, the principal men gather in the temple and decide to sacrifice an ox or two, which means a 'feast,' or propitiation of the gods, lasting for two days. Then there is the feast of new squashes and that of the new corn, as well as that of toasted corn, connected with the cult of *hikuli* (Sp. *peyote*); but the greatest of all is the feast for eating corncakes, which are made from ground whole corn, and baked in an oven.

Very important in the religious life of the Huichol Indians is the use of *hikuli*, a small species of cactus (*Anhalonium lewinii*) which grows abundantly in the central mesa of Mexico. No doubt it is the same plant which in southwestern United States is called 'mescal buttons.' The same name, '*hikuli*,' is applied to this plant by the Tarahumares, who make journeys to the east to gather it, as do also the Huichols.

It appears that the gods, once upon a time, left the Huichol country, and went out to the country where *hikuli* is found to-day. A gigantic deer is the god of *hikuli*, and is called Ta-máts Pá-li-ke Ta-mo-jæ-ke, signifying "elder brother, walking at daybreak, everywhere," no doubt the dawn god. The plant is considered as the votive bowl of Ta Té-wa-li, the god of fire and the principal god of the Huichols, and has to be procured every year, or it will not rain.

In September parties from the various districts of the country start out to gather the plant, which is found near San Luis Potosi, in the State of the same name. They stop over night at the same camping places every year, going and coming, and have gods all the way along in the shape of mountains or springs. The time consumed in going is seventeen days. They remain at the place three full days, and are twenty-three days on the journey back. After the return of the *hikuli*-seekers to their own country they first spend many weeks in procuring a number of deer, so neces-

sary for the *híkuli* feast. The meat of the deer, having first of all been cooked between hot stones in earth mounds, is cut into small square pieces, and strung on strings and dried, and in that way kept for the feast. When the needed amount of deer-meat has been obtained, the *híkuli*-seekers must next cut down the brushwood and trees at a certain place, this being the first preparation for the communal field on which the new corn a few months hence will be sown. Immediately afterward the feast comes off, generally not before December or January. As indicated above, it forms an integral part of the feast for eating toasted corn, and is named accordingly *ra-ri-ki-ra* (*ra-ki* meaning 'toasted corn').

During all the months consumed in preparations for this feast, from the time of first starting out to gather the plant, until the feast is over,—a period of from four to five months,—entire abstinence from sexual intercourse, and from eating salt, is imposed; nor is it allowed to bathe or wash. Both men and women take part in the dance of this feast, which is afterwards, as is the case with most of their feasts, repeated at each ranch.

A peculiar feature in the *híkuli* ceremonies is the painting of the faces, in various designs, with a yellow root brought from the same country where the plant grows. These designs, which may also be found on the tobacco-gourds of the *híkuli*-seekers, are of different patterns, but are all signs of fire, in honor of which the whole feast is carried on. Both men and women partake of the drink made from the plant.

The effect of this plant on the nervous system is exhilarating, and it allays the feelings of hunger and thirst. Although, when fresh, it has a nauseating, slightly sour taste, it is wonderfully refreshing when one is taking exercise. So far from suffering fatigue in walking, one feels as if pushed along, as I can testify from my own experience. In this respect it resembles Peruvian coca; but, unlike that remedy, it leaves a certain depression, as well as a headache. Although one feels as if drunk after eating *híkuli*, and the trees dance before his eyes, still the balance of the body is very well maintained. It is also very important to note that a marked effect of the plant is to take away all sexual desire, this no doubt being the cause of the Indians imposing, by a curious aboriginal mode of reasoning, abstinence from sexual intercourse as a necessary part of the *híkuli* cult.

Professor A. Heffter, of Leipzig, writes me that, having made experiments with this plant upon himself, he had beautiful color visions. This he attributes to the new substance, which he calls 'mescalín,' discovered by him in the plant (see also the article 'Beiträge zur chemischen Kenntniss der Cactaceen,' in 'Apotheker-Zeitung,' 1896, No. 79).

During the months of preparation for the feast of *híkuli* the Indian is constantly seen eating slices of the fresh plant, cutting it lengthwise, and generally not consuming more than one slice, perhaps a quarter or a half of one plant, at a time. As a rule, a man does not eat more than four or five a day; but the number may reach as many as twenty. When taken in moderate quantities it has the effect of making him merry and good-tempered, and of putting him in a singing mood. His eyes assume a peculiar stare. His step and his movements become quicker than usual, although steady. He shows in his ecstasies, however, nothing similar to the effects of alcoholic drinks. In a few cases a man may consume so much that he is attacked with a fit of madness, rushing backward and forward, trying to kill people, and tearing his clothes to pieces. People then seize upon him, and tie him hand and foot, leaving him thus until he regains his senses. Such occurrences are thought to be due to infringements of the law of abstinence imposed upon them before and during the feast.

Híkuli is generally strung on long strings to dry, being in this state hung up in coils, like huge necklaces, in the temple or at the houses. When the feast comes on, the plant is dry, or nearly so, and, mixed with water, has invariably to be ground on the *metate*. A kind of thickish drink, rather brown in color, is produced from it, which is offered in small quantities, but at frequent intervals, to those present. It is never mixed with any other drink.

This plant is also used to a certain extent by the Cora Indians, who buy it from the Huichols. Both tribes cultivate the plant on a very small scale; liliputian gardens, or tiny patches of land, being enclosed with a stone wall for the purpose.

The plant is also considered to be medicinal, being rubbed on the body in cases of rheumatism. Rubbing it on the knees is said to insure strength in walking, and taken internally it is thought to give life.

The moving principle in the religion of the Huichols is the desire of producing rain, the deer and the *híkuli* being the chief factors in attaining this end. Once upon a time the all-important thing for the Huichols to eat—the deer—became god, and he is to them the symbol of life and of fertility. With his blood the grains of corn are sprinkled before being sown. The great god of *híkuli*, when he appeared the first time out in the country of the *híkuli*, showed himself as a deer, and every one of his tracks became a *híkuli*-plant—the plant of life; and the life is that of the deer.

Of very great interest in this tribe are their many symbolic objects—ceremonial arrows, ‘faces,’ shields, ‘eyes,’ votive bowls, etc.

Ceremonial arrows are inseparably connected with the life of the Huichol, the arrow representing the Indian himself in his prayers to the various gods. At all important events of his life, from his birth to his death, an arrow is made and sacrificed, and no feast can be imagined without the presence of arrows.

Very peculiar are the ceremonial ‘faces’ or ‘appearances’ (*ne-a-lí-ka*) of the god supplicated. They are either hung to an arrow or placed separately in the small god houses or sacred caves. They are generally round in shape, looking like a diminutive shield made from split bamboo (*otate*) reeds, interwoven with cotton cord and crewel of various colors so as to represent mythological persons or events.

Other symbolic objects are the so-called ‘shields’ (*ndm-a*), rectangular in shape, looking like a diminutive matting, but made from splints of bamboo, interwoven with cotton cord and crewel of various colors so as to represent figures of mythological importance. These objects refer to ancient times, when the gods, or ancient people, covered their backs against the rays of the sun, or their fronts against the arrows or other missiles of their enemies.

Interesting, too, are the ‘eyes’ (*si-kú-lí*), meaning the eyes of the gods. These are small crosses of wood, interwoven with cotton cord and crewel of various colors so as to form a square, which, however, is hung by one corner to an arrow. Sometimes one of the cross-pieces is made very long, so that the symbolic object is stuck in the ground in the same way as are arrows. In

this respect these symbolic objects are exactly like those found in the graves of Peru and among living tribes, for instance, the Tarahumares. Mr. Frank Hamilton Cushing has drawn my attention to the false head of a Peruvian mummy (from Ancon) actually having placed upon it, as eyes, such very objects. They are placed so that opposite angles come where the corners of the eyes would be.

Exceedingly important in their cult are votive bowls. These are ordinary gourds used as drinking vessels, the gourd being cut in two ; and the bowl thus formed is painted inside with red ochre mixed with the ground kernels of a certain plant, called in Spanish *chia*, which is very oily, and gives it a kind of polish. These are the ordinary drinking vessels of the Huichol Indians ; but when used for symbolic purposes they are adorned with glass beads, which are fastened to the inside or outside with beeswax, and arranged in various designs, being thus turned into drinking vessels of various gods.

All these symbolic objects are made on certain occasions, either for the tribe or for some private individual, and placed in god houses, sacred caves, or other consecrated localities of the gods, praying their silent prayers.

A Deluge legend is well established in the tribe, and with many particulars.

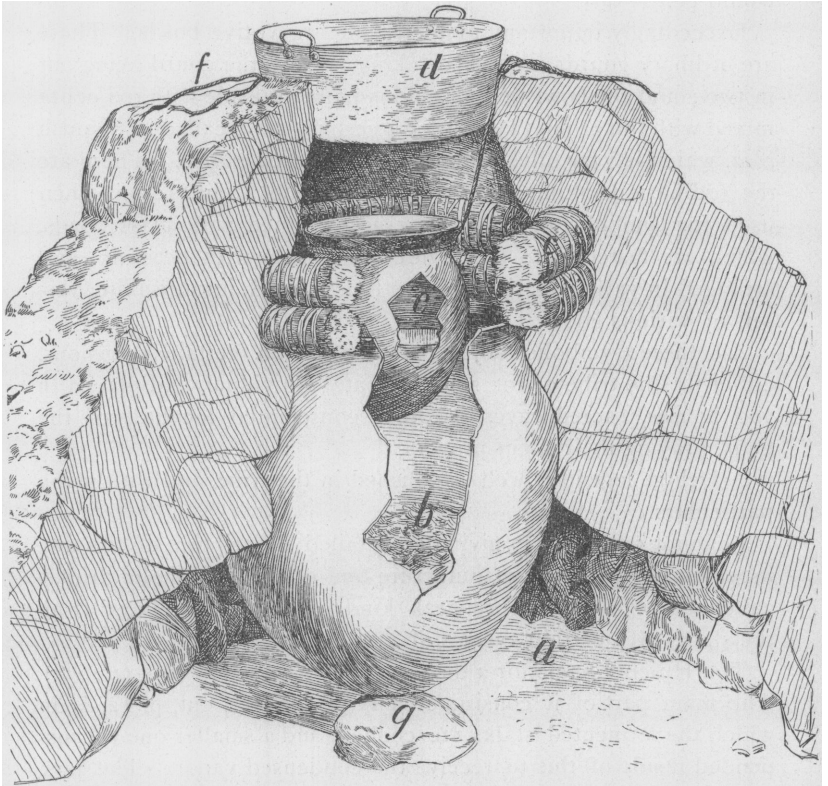
I cannot refrain from giving a detailed description of the way in which the Huichols manufacture one of their alcoholic drinks, called *taatsy*. It is a very weak kind of brandy, produced from the stalks of a certain species of agave.

The Huichol name for a distillery is *sai-at-sd-mi* (Sp. *taberna*). The main part of it consists of a large jar (see cut, p. 12, *b*) in which the fermented stalks are cooked, and a smaller one (*e*) suspended inside of this to receive the condensed vapor. The jars, of course, vary somewhat in size in different distilleries, but the measurements given below are those of specimens which I brought back with me, and which well represent the ordinary type of the Huichol distillery.

The large jar measures 38 cm. in height, 1 cm. in thickness, and 33.5 cm. in diameter at the mouth ; and it is made of rather coarse pottery-ware. The small jar measures 14 cm. in height

by 18.5 cm. in diameter of mouth, and is made of similar material.

On top of the large jar are placed two, and sometimes three, solid rings (*c*) of straw (*to-ni-ku-li*), one over the other, each 5.5 cm. thick, which fit exactly over the brim, forming, so to speak, an 'elongated neck' to it. Round this jar with its 'elongated neck'



Sectional View of Huichol Distillery.

is erected a mound-like structure of stone and mud, which holds the upper part of the jar firm, as well as the 'elongated neck,' but widens out toward the ground, forming a kind of oven (*a*) around the lower part of the jar. This oven has openings on either side to afford a draught for the fire. The jar does not rest on the ground, but on a medium-sized stone (*g*), thus increasing the draught, and

facilitating the heating of the jar. The earth and mud not only hold the 'elongated neck' in place, but also rise some eighteen or twenty centimetres or more above it, forming a kind of funnel. Into this funnel the cooling-vessel (*d*) fits snugly, the bottom of it remaining some ten to twelve centimetres above the straw rings.

The small jar (*wi-vi-á'-le-a-mi*), or receptacle for the liquor, hangs down into the big one, suspended by two cords (*f*) of *ixtle* (yucca), which pass up along the sides of the cooler, and fall down outside over the mound. The cords are held in place solely by the pressure of the cooling-vessel against the sides of the mound.

Steam from the large jar condenses on the bottom of the cooler, which is kept filled with cold water, and falls in drops into the receiver below. That the steam may not escape round the cooling-vessel, the man in attendance plasters it round thickly with mud, and he now and then removes the cooler to see how the distillation is going on. When he finds that the receiver has become filled with liquor, he lifts it up, empties it into a large jar standing near, and then replaces it to receive more. He now puts the cooling-vessel in place again, plasters mud around it, and the distillation goes on as before.

The liquor produced in this way is very rarely distilled a second time. It is therefore very watery, but not unpleasant to the taste. Used in considerable quantities, it is intoxicating, still it does not seem to do much harm to the constitution of the Huichols. The liquor is never kept long, and has to be made to order for any approaching feast.

The Mexicans derive their famous *tequila*, or mescal, which is the strongest alcoholic drink produced in Mexico, from the maguey (*Agave americana*). One of the inferior kinds of brandy, *sotól*,¹ is produced from another plant of the same family, *sotól*; and this is the plant from which the Huichols extract their alcoholic drink. All the leaves are cut off from the bulb-shaped stalk, or 'heart' (Sp. *corazon*) of the plant, as the Mexicans call it. These 'hearts' are subsequently cooked by being placed between hot stones, and covered with earth, a layer of grass being put between.

¹ Sometimes in Mexico all native brandies, and there are several kinds, are comprised under the general term 'mescal.'

They afford a sweet article of food, very indigestible, but agreeable to most Indian tribes of Mexico.

This sweet stuff is crushed, mixed with water, and left to ferment for about a week in the open air, without any cover, in a cowhide, which is made to serve as a bag by suspending it between four poles. There is no other name for this bag, among the Huichols, than the Spanish *bóta*; but the Mexicans have, besides, the name *el cuero*.

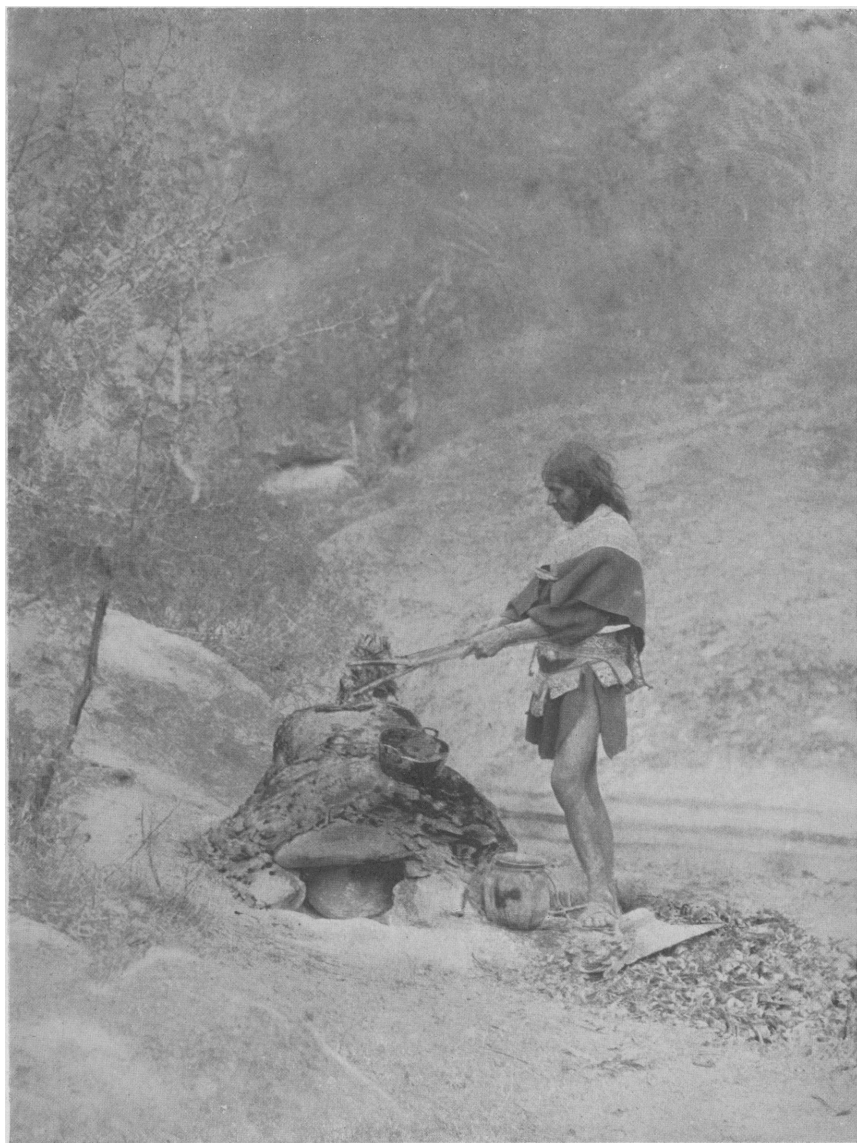
It will thus be seen that the only parts of the distillery that the Huichols have adopted from the Mexicans are the fermenting receptacle and the cooling-vessel. It was only to be expected that, with the introduction of cattle, a cowhide bag should take the place of a natural cavity in the rock, as a more convenient receptacle for the fermenting stuff. The cooling-vessel, which is at present bought in Mexican stores, and is of copper and round in shape, has the same name as that used by the Mexicans—*el caso*. Probably not longer ago than fifteen or twenty years wooden cooling-vessels of similar shape were used. I was anxious to secure one of these vessels; but the only man capable of making one in the southeastern part of the country, where I was staying at the time, was absent, and thus neither time nor circumstances allowed me to procure a specimen.

The accompanying illustration (Plate II) shows the man in the act of renewing the fermented stuff in the boiler, or cooking-jar. He has taken out the receiver, which is standing in front of him; and the cooler rests on the side of the mound. He is now engaged in emptying the boiler of the bits of stalk that have already been utilized. For this purpose he employs two fork-shaped sticks, the forked part being covered with a coarse network of *ixtle*, which form convenient implements for extricating the hot material. The refuse is thrown away in a heap to one side, as seen on the right of the picture.

The process of distillation among the Huichols is to my knowledge the most primitive found on the continent. A step higher in evolution is the method employed by their neighbors and relatives, the Cora Indians, which, although in detail more primitive than that of the Tarasco Indians, is practically identical with theirs, as described by the late John G. Bourke, in the 'American Anthropologist' for January, 1893, Vol. VI.



HUICHOL INDIAN IN HIS ORDINARY DRESS.



HUICHOL DISTILLERY.

