

parade ground is in the center, and here the writer saw many battalions of prisoners mustered during the war. They were sent down in transports, and as they marched ashore were a sorry lot. Many were manacled or secured with ball and chain, being considered desperate characters, and sentenced to Dry Tortugas for a term of years.

Prior to the establishment of Fort Jefferson, in 1847, the islands were the resort of wreckers and pirates, who reaped a rich harvest from the wrecks of the time. The writer discovered a large Spanish gun, with the coat of arms of Spain still intact, on the shoal reaching out from Bush Key. The gun was raised and placed in the fort.

More important than Tortugas is Key West, where a city has sprung up, and property valued at millions of dollars is almost entirely unprotected. The island of Key West is about five miles in length and one in breadth. The city, or rather the most prosperous portion of it, is on the southwest side, where the reef reaches away and affords protection to a fine harbor—one which would float the navies of the world, and is of great importance as a naval station. The island rises to a maximum height of twelve feet, this being a calcareous ridge. At other places it is but a few feet above the water. Yet the accumulation of soil is sufficient to afford luxuriant vegetation, the island being covered with trees, bananas, plantains, guavas, coconuts, tamarinds, and other tropical fruits being prominent.

The armament of Key West is of the ancient type, and entirely obsolete. It consists of a fine fort of the old style. Fort Taylor rises directly from the water on the southwest side, commanding the approach to the harbor. It is connected with the land by a drawbridge, having a fine front of granite and brick, with castellated walls, bastions, etc. Like Fort Jefferson, Fort Taylor is pierced for three tiers of guns. The accessory defenses consist of two martello towers. These have casemated walls, but are useless from a modern standpoint.

The question of climate is one which interests many when this region is to be repopulated with troops. The writer spent several years at Tortugas, and is prepared to say that, when the quarantine rules are absolutely lived up to, it is as healthful a place as one could wish.

The great reef which surrounds the Florida keys in former years was interesting as being the only coral reef on the American continent within the jurisdiction of the United States. At Tortugas it represents an area of seventy-five or one hundred square miles, and was a vast grove of coral polyps, cut here and there by the deep blue channels peculiar to the region; but some peculiar occurrence has changed much of this. A few years ago the coral of the reef, even so far as Key West, died, and at present it is difficult to find any in shoal water, where formerly it could

be taken up by the cartload. It is assumed that an earthquake opened a crack in the vicinity, permitting sulphurous fumes or some gas to escape that destroyed the polyps. This is of course theory, but the fact remains that something occurred which resulted in the almost total destruction of coral life in this locality. But this may be only temporary. Corals grow much more rapidly than is generally supposed, and in a short time the reef will again blossom with these mimic flowers.

H. L. RUSSELL and S. M. Babcock consider that profound changes of a physical and chemical nature, which occur in milk from which bacterial fermentations have been excluded, are of a non-vital character and due to the presence of ready formed enzymes in the milk as obtained from the cow. Moreover, they have separated out proteid converting enzymes, and proved that they exert a curdling as well as a digesting function when applied to milk. They believe, therefore, that the ripening of hard cheese is caused by the joint action of bacteria and enzymes.—*Nature*, lvii., 373.

PUEBLO ARTS AND INDUSTRIES.—II.

BY COSMOS MINDELEFF.

The western tribes of the Pueblos, and especially the Moki Indians of Arizona, have been but little affected by the march of time since the Spanish conquest three and a half centuries ago, and many of their arts and industries are almost exactly the same as they were when described by Castañeda. In the eastern Pueblos, along the Rio Grande, there have been many changes in the life of the people, who have been to a certain extent Mexicanized, and the arts found in an almost aboriginal state in the West, on the Rio Grande are all more or less modified by that influence. The more primitive western tribes have, therefore, received much more attention from scientific investigators, and are naturally of more interest in the present state of our knowledge. When the purely aboriginal features of Pueblo arts have been exploited, the study of modifications due to contact with a higher culture will have an even greater interest.

The illustration shows the native costume of the Moki women, as also the style of hair dressing peculiar to them and described in the last paper of this series (*SCIENTIFIC AMERICAN*, January 15, 1898). The essential part of the dress is a blanket woven in a fine lozenge pattern, of native black wool, bordered with a wide band of dark blue, separated usually from the body of the blanket by a raised cord of green. The two ends are brought together and sewed, except a space of a few inches to allow the passage of the arm, thus forming a baglike garment open at both ends. In use the blanket is draped over the person in the manner shown in the illustration, passing under the left arm and over the right shoulder, the right arm passing through the opening left near the top of the seam. When the wearer is not at work, the blanket is often drawn over the left shoulder, leaving only the right arm free, as shown in the uppermost of the three figures in the illustration.

Sometimes an additional blanket is thrown over the shoulders. Castañeda says: "The women wear blankets, which they tie or knot over the left shoulder, leaving the right arm out." That description, so far as it goes, applies as well to-day as it did in 1540. He adds that "They gather their hair over the two ears, making a frame which looks like an old fashioned headdress."

The blanket dress constitutes practically all of the native woman's costume. On occasions, and especially when she goes away from home, a woman may wear moccasins, made of deer skin with rawhide soles. A large part of the deer skin is left attached to the moccasin, and is wound round and round the lower leg, forming a bulky kind of legging, but this is more often seen among the Navahos, who travel much, than among the Pueblo women, who seldom leave home. It is a common sight, however, along the railway which passes near some of the eastern Pueblos, where the women congregate on the platform at train time, to peddle fruit and pieces of pottery to the passing traveler. There also the native blanket dress can be seen, usually worn over an underdress of calico print. This underdress is rare in the West.

There is a charming simplicity about some of the customs of the western Pueblos, which still retain their aboriginal form. When a young man has determined in his own mind that life without a certain young woman would be but a dreary waste, he speaks to his own parents about the matter and they prepare for him a little bundle of gifts, in which is usually included a blanket and a buckskin. This bundle he takes to the house of the young woman and leaves it there carefully and by stealth, so as not to be seen; but usually a pair of very interested eyes watch his movements from within. If the bundle is returned, he knows that he must seek elsewhere; if it is retained,

he thereupon becomes an accepted suitor, and thereafter the young couple can be seen on any bright day in some sheltered nook on the house top, the man knitting himself a pair of woolen leggings or footless stockings and the girl dressing his hair with a bunch of grass or straw, the ends of which serve as comb and brush; for these people are very proud of their long black hair, and devote much time to its care. When all the preliminaries are arranged, the man goes to the house of the woman's people and becomes an adopted member of her family. This custom has had a marked effect on the architecture of the villages, as will be pointed out in a later paper of this series. That the custom is an old one is evidenced by the remark of Castañeda: "When any man wishes to marry, it has to be arranged by those who govern. The man has to spin and weave a blanket and place it before the woman, who covers herself with it and becomes his wife."

Although the Navahos now make only the coarsest and cheapest blankets of native-grown wool, using fine Germantown yarn in their finest work, the Moki still make their best blankets of yarn spun by themselves. Their best work is the woman's dress blanket,



HOPI MAIDENS, SHOWING PRIMITIVE PUEBLO HAIR DRESSING.

Perhaps the best known art of the Southwestern tribes, aside from pottery making, is blanket weaving. The blanket is an integral part of the Indian dress, and in the manufacture of the highest grade the Moki have always been pre-eminent. Oddly enough, among these Indians weaving is the work of the men, whereas in other tribes, and especially among the Navahos, who roam over the surrounding country, the weaving is exclusively done by women. Much has been written about Navaho blankets, and within recent years enormous quantities have been shipped out of Arizona and New Mexico by the traders, but the much finer Moki blankets are but little known. Among the Navahos the art has already passed through that stage of degeneration which invariably attacks a native art for the products of which a large foreign demand arises, and it is difficult now to purchase a Navaho blanket more than a year or two old, while the types, both of design and weaving, prevalent five or six years ago are now practically unknown. Such conditions are now just beginning to affect the Moki manufactures, and it is interesting to note that the changes of a year or so past are greater than those of the previous three centuries.

and although not so elaborate in design or gaudy in color as the Navaho product, it is technically equal if not superior. There is a tradition that when sheep were first introduced by the Spaniards they were never shorn until death, so that the supply of wool was very limited; but, be that as it may, the Indians now shear their sheep regularly and dispose of most of the product to the traders, for their own needs are but slight.

The illustration shows the manner of spinning and weaving, both very primitive, but still effective. After the wool is washed it is carded on metal cards purchased from the traders and made into coarse yarn, with the aid of a spindle consisting of a light stick on which a disk of thin wood is mounted. The stick is rolled on the thigh, and no wheel or any other appliance than the simple spindle is used. Should any dye be used, it is applied always to the finished yarn, but black, white and brown wools are often used without dyeing.

The loom is extremely primitive, as the illustration shows. Among the Navahos it is set up in the open air wherever convenience dictates; among the Mokis it is usually inside the house, although examples are found now and then on the terraces. The finest blankets are woven on looms set up in the sacred underground chambers or kivas, which are not in ceremonial use during the summer months and are at that time used as a club and lounging place by the men of the tribe. Many of the kivas have appliances built into them at the time they were constructed, for the attachment of looms, and were apparently designed as much for use as blanket factories as for ceremonial purposes. The Moki blankets have long been an article of barter with other tribes.

The process of weaving is extremely tedious and slow, and often months elapse between the beginning and the completion of a blanket, but time is not an element considered by an Indian workman. If he can secure \$3 for an ordinary saddle blanket, he is content. A bed blanket brings from \$6 to \$10, while fancy blankets of American yarn have been sold for \$50 and \$60. The dress blanket of the Mokis can seldom be purchased for less than \$10, and they are difficult to procure at any price.

There is a considerable demand for Indian blankets on the part of travelers and men who live more or less in camp, but it is a singular fact that Indians themselves never use them as a body covering when they can procure others of American make. It is no uncommon sight in a trader's store to see an Indian trading three or four native blankets for one of American manufacture. The reason is simple. Owing to the coarseness of the yarn and the crude looms employed, the native blanket is heavy but is not warm. Cold winds penetrate it easily, although one of the types common a few years ago was woven of hard twisted yarn beaten down so firmly that the blanket would hold water for several hours. In a bed, where the blankets are covered by others and protected from direct contact with cold air, they serve fairly well, although heavy in proportion to their warmth. The Indians themselves seldom use beds of any kind, and have little use for warm body coverings, except when in the open air. When a man is at home, his costume consists usually of nothing but a breech cloth, and children of both sexes run naked until they are five or six years old. The body thus becomes inured to changes of temperature, and the ordinary costume of calico shirt and breeches is sufficient.

But the nights are always cool in the plateau country, owing to its great elevation above the sea, and some additional covering is then necessary. The blanket supplies the needs of the people exactly; but the American blanket is so much softer and more flexible, so much lighter in weight, and, withal, so much warmer, that it has practically supplanted the native product for Indian use.

TRUFFLES will soon be cultivated on scientific principles and are likely to become cheaper. M. Chatin, who discovered that the truffle is a mushroom, has announced to the Académie des Sciences, at Paris, that the Duc de Lesparre, brother of the Duc de Gramont, has found out how it germinates and on what leaves its spores will become fruitful.

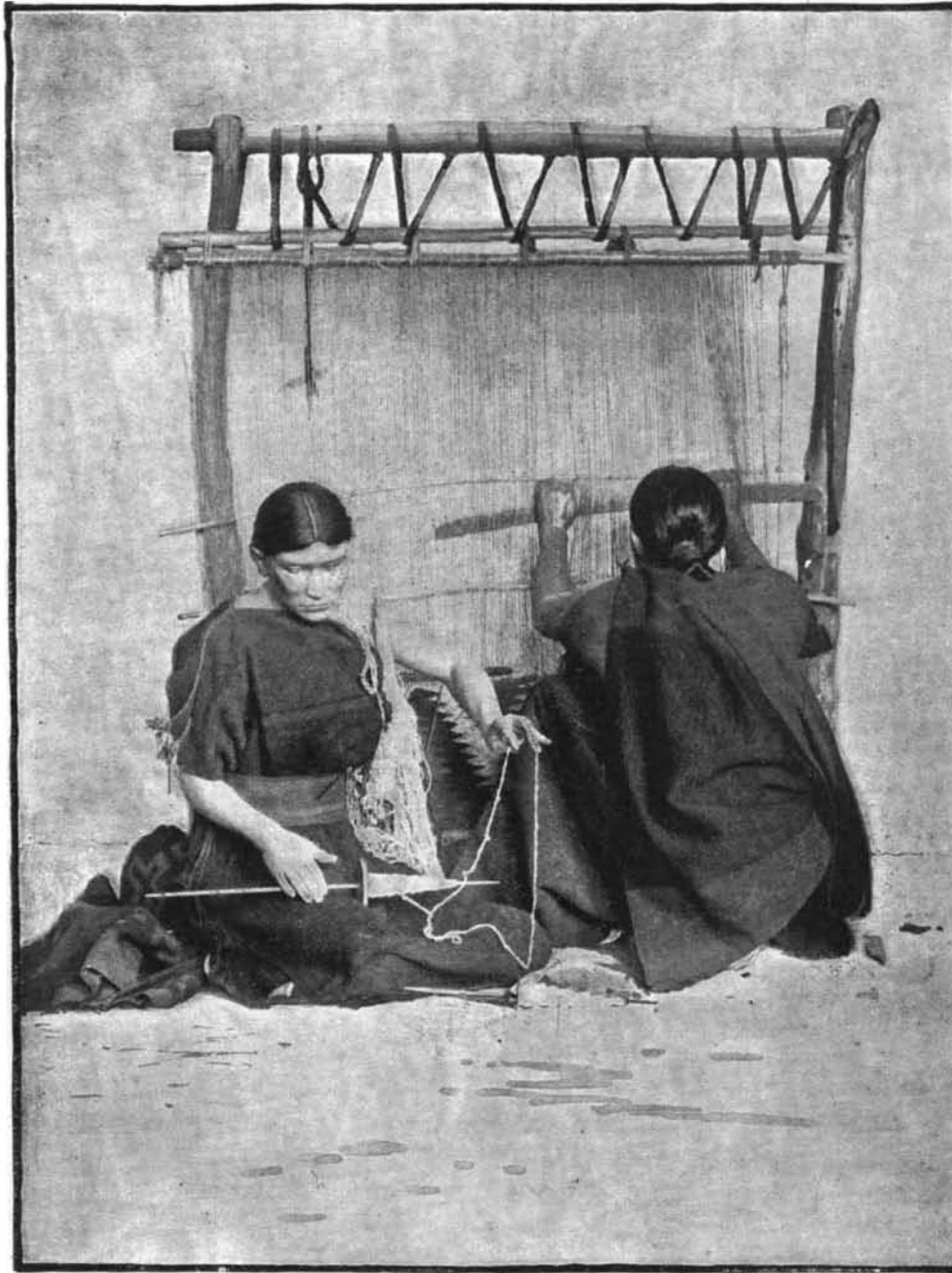
Physiological Effects of Snake Venom.

The effects of snake bite, the physiological influences of snake venom, have been a subject of extreme interest to the schools of medicine and the wider audience of the unprofessional public. Experiments have been made by a series of observers, and the prevalent impressions of those who have witnessed the results of snake bite in the human subject have been recorded and compared. In the Journal and Proceedings of the Royal Society of New South Wales for 1895-96 I have recently come upon a rather comprehensive article on this topic, from which, on account of its new data, I condense a general review of the subject, which must interest the great number who regard this singular pathological phenomenon with natural wonder.

Prof. C. I. Martin, who prepared the paper referred to, has especially experimented with the poison of the Australian black snake (*Pseudechis porphyriacus*), one of the most deadly and sinister of the group of vipers. Snake poison is rapidly absorbed when introduced in a serous sac "such as the pleural or peritoneal cavity;" its effects most quickly shown when introduced directly into a vein. The interesting question whether snake venom can be absorbed by the mucous membrane of the alimentary canal seems answered in the negative.

animals, the frog. In the case of injection the hemoglobin crystallizes even within the body. "The urine nearly always contains such crystals, and on three occasions an animal died two or three days after the injection of the poison with suppression of urine, and microscopic examination of the kidneys has shown the tubules to be completely blocked with hemoglobin crystals." Martin is inclined to believe that the disappearance of the leucocytes is due to their collection in the tissues, not to their rapid destruction. Generally venom induces clot, but this tendency is succeeded by an opposite effect. In one instance "the blood in the whole vascular system, excepting only the pulmonary veins and the left auricle, was found to be solid." Recently fed dogs died from venom in a shorter time than fasting dogs. Rapidity of injection hastens death. Large quantities of venom can be introduced slowly into the circulation without producing clotting. The first portion increases coagulability, this is superseded by an opposite action, "and the establishment of this inhibitory phase confers immunity against the remainder of the injection." The resistance to clotting establishes so-called "negative phase blood," in which the delay to coagulate reaches such a limit that putrefaction first sets in. The toxic bodies known as nucleo-albumens produce identical results with those caused by venom.

In man, after death from poisoning, the blood is almost invariably fluid—a result due to resistance, by which the negative phase superseded coagulation. Venom destroys the germicidal power of serum. Venom breaks down the walls of the blood vessels, causing internal hemorrhages. The power of venoms from different poisonous species varies, in this respect, greatly. Boiling or raising the temperature of venoms very markedly diminishes their toxicity. The venom depresses the circulatory mechanism. After injection the blood pressure is lowered and a profound action upon the circulation effected. Again, blood pressure may subsequently be increased owing to intravascular clotting, by which the arterial blood is prevented from emptying itself into the veins. Martin inclines to the belief that the fall in blood pressure from venom "is mainly due to a direct action of the poison upon the heart," not, as assumed by Mitchell and Reichert, upon the vaso-motor centers. Kidney and spleen contract in volume from snake venom. Snake venom affects the nervous system, causing "depression, faintness, loss of co-ordinating power and ultimately paralysis." Martin describes the effect of venom upon an animal as follows: "It produces uneasiness which varies according to the amount injected, sleepiness, lethargy, and, in a dog, vomiting. The lethargy increases and is succeeded by weakness, which is at first most manifest in the hind quarters. The animal remains quiet and disinclined to move. If made to walk, its gait is unsteady and accompanied by inco-ordination of movement. At the same time it responds less readily to any form of stimulation and its senses appear dulled. Later it is quite unable to stand, the



SPINNING AND WEAVING.

Weir Mitchell showed that it was not absorbed from the crop of pigeons, though in the case of abrasions of the same it was. Fayrer and Richards thought they proved a slight absorption, which modified Mitchell's conclusions. Martin found two rats in excellent health at the end of a week which "were fed daily for one week on bread and milk containing one hundred times a fatal dose of venom." But abrasion of the stomach resulted in death in two hours and a half. The faeces contained no venom. It was supposedly destroyed in the alimentary tract, as it is decomposed by artificial pancreatic digestion. It is not destroyed by gastric digestion. A third experiment seemed to show a slight absorption.

Venom introduced in the blood kills the leucocytes, changes and decomposes the red cells, dissolves out the hemoglobin and leaves shriveled nuclei. These nuclei "soon began to swell, the granules became less distinguishable and eventually disappeared. The disappearance of the red cells was so complete that at the end of fifteen minutes there was nothing except the slight coloration of the field to distinguish the preparation from one of lymph." Blood corpuscles of different mammals exhibit marked variation in their power of resistance. The dog seems the most sensitive; among lower

pupils become dilated and insensible to light, and the breathing shallow and slowed." Again, "It would appear as if the poison must reach a certain proportion in the circulating blood before it can seriously interfere with cardiac contractions, but once this proportion is reached, the heart is very speedily and profoundly affected." Respiration at first quickened, in the next stage is diminished and asphyxiation results. Body temperature may be increased or lowered, owing first to a distinct heat-producing (thermogenic) effect and secondly to refrigeration induced by depression and muscular apathy.

In cobra poisoning, convalescence, if the system successfully resists the venom, is abrupt, and no bad effects supervene, not even albuminuria; but in viper poisoning "the animal suffers from great local and widespread hemorrhage and œdema, which almost invariably suppurates." L. P. GRATACAP.

PARIS has found it necessary to put a check to the haphazard decoration of her public places. The prefect of the Seine has appointed a technical committee of artists, architects, and other competent judges, to which all plans affecting the outward appearance of the city must be submitted for approval.