the medical profession cannot be discriminated against, any more than the members of any other profession or trade. This decision will, we presume, be appealed from, and the final result will be watched with interest.

WASHINGTON SCIENTIFIC NEWS.

Zuñi Mythology and Religion: a Valuable Contribution to Anthropology. — The Life-History of Tænia Pectinata: Does the Presence of this Parasite explain the Winter-Killing of Sheep? — The Function of the Bone in Anchoring Implanted Teeth: Result of Dr. W. M. Gray's Investigations. — Some Recent Discussions of Target-Shooting. — Obscure and Conflicting Phenomena of the Drift North of Lake Ontario. — Sources of Error in the Determination of Atomic Weights. — The Pristine Homes of the Indian Tribes of this Continent.

Zuñi Religion.

THE annual meeting of The Women's Anthropological Society, held March 8, was a memorable one in the history of that organization. The paper of the evening was read by Mrs. T. E. Stevenson, the president of the society, on the Zuñi religion; and the most accomplished anthropologists in Washington, who were present as guests, pronounced it, in the conversational discussion which followed, to be the best presentation of a savage religion yet written.

Introducing her subject, Mrs. Stevenson said, that, according to Zuñi tradition, all Indians entered this world in the far North-west, having ascended through three lower worlds before their advent here. "The Zuñi came to this world by the command of the Sun," she said, "who sent his sons, Ah-ai-u-ta and Ma-a-se-we (two little war-gods) as bearers of his message, and to guide them to his presence. They ascended from the lower world through a huge reed. Po-shai-yan-tka, the high priest of the Zuñi, followed immediately after the gods. The other priests came next in succession; then the eight original medicine orders and all carnivorous animals. Upon reaching this world, the Zuñi for the first time beheld the light of day, and they bowed to the earth, and hid their faces in fear. It was discovered by the light of day that the Zuñi possessed long, hairless tails, which Ah-ai-u-ta amputated with his stone knife. According to the word of the present priest of the warriors, the people also had long ears, reaching to the ground, which they rolled and tied up by day, while at night they served as a bed and covering.

"The Zuñi do not believe they existed in interior worlds as animal species, other than Zuñi themselves, with their great ears and hairless tails. The other animals could communicate with them as between man and man. These animals were superior to the Zuñi, and were then, as now, mediators between them and the gods. They held all medicine secrets, which they revealed to the Zuñi only after coming to this world."

Mrs. Stevenson then enumerated the medicine orders in the succession in which they reached this world. "These orders," she said, "also the priests of the cardinal points and others, brought many precious articles from the lower world, which they carried on their backs in sacred blankets, the E-to-ne being the most valued fetich they brought. The E-to-ne is a miniature sarcophagus, in which two frogs and two tadpoles, the first offspring of the frog, seeds of cotton, and other vegetation, are incased. On the top of this stone case are eight te-lik-yi-na-we, or plume-sticks, laid lengthwise, about an inch of each one projecting over the edge of the box. Between the eight plume-sticks is an ear of corn representing the mother-corn, or fecundity. The case is wrapped with a piece of ancient cotton cloth, and around the whole are strings of turquoise and ko-ha-qua beads. In some instances the E-to-na is so heavily wrapped with beads that nothing else is to be seen except the projecting ends of the plume-sticks. On the end of each stick a breast-feather of the eagle is attached, pendent, by a cotton cord of native manufacture. The Order of Rain has, in place of the E-to-na, a female stone image, eight inches high, — the Wi-ha-tsan-na Ah-win-tsi-ta, the great mother of all infants.

"The Order of the Ha-lo-o-que has, instead of the E-to-na, a stone knife, the destroyer of all enemies. This knife is about twelve inches in length."

After enumerating the other medicine orders, Mrs. Stevenson gave in very brief outline the story in connection with the forming of the Order of the Hunters, as follows: —

"A strange people were discovered by certain ancestral gods. Three of the gods were captured, and a battle was the result. The lines of the enemy were protected by the tCha-que-na, the keeper of all game: she passes to and fro, shaking a rattle. Great efforts were made to kill the woman, and, though many arrows pierced her breast, she still continued to walk, and shake the rattle. The war-god, Ah-ai-u-ta, finally declared she was carrying her heart in the rattle: he aimed his arrow at the rattle, struck it, and the tCha-que-na fell dead. It was now an easy matter to rout the enemy and enter their home, which they did, opening the wall that enclosed all game, permitting it to go where it would, and thus the game spread over the earth."

The stories of the origin of the other orders were also given briefly, and then Mrs. Stevenson continued the Zuñi account of their establishment in their present home, as follows: —

"Po-shai-yan-tka did not remain long with his people after reaching this world: he travelled with them for a time southward, then, separating from the main party, he, accompanied by the orders of the Ne-we-e-que and Shu-ma-a-que, his wife, I-ya-ti-ku (who was very beautiful and good), and all the animals that came to this world with him, travelled far to the east, then south. A long time was consumed in his journeying, and he built many villages on the way, and, finally reaching the Rio Grande, built houses in the cliffs. These the Zuñi locate as the line of Cavate houses west of the pueblos of San Juan and Santa Clara, in New Mexico. They extended some thirty miles along the right bank of the Rio Grande. These ruins are known to the Zuñi as the singing house of Po-shai-yan-tka; for it was here the animals gave to Po-shai-yan-tka their songs and medicine secrets, he in turn instructing the people. Po-shai-yan-tka, before separating from his people, gave to them the priest Yan-a-o-loo-a to be to them a father in his absence, he promising to return to them, wherever they might be. Old Zuñi priests say they are weary with watching for his return. The name of this departed priest is so reverently held by these people, that it is seldom mentioned excepting in prayer, and each day prayers of supplication are made for his return. This priest is believed by the Zuñi to be the Montezuma known in Mexican history.

"The Zuñi, led by the war-gods, travelled many years to the south, then east, stopping often to build villages, where they for a time lived. Besides the thirteen medicine orders of Zuñi, there is an order to which I referred in a paper previously presented before this society, — the Order of the Kok-ko, the mythological period. It will be remembered that I mentioned in that paper the transformation of a boy and girl upon a mountain-top, who had been sent in advance to look for a place on which to build a village. After the transformation, the youth descended to the plains below, swept his foot through the sands, and created a river and a lake, and in the lake a group of houses, the centre one being the great assembly-house for the Kok-ko. The first three gentes to cross this river were the Sand-hill Crane, Bear, and Corn. The women were afraid, and dropped their children into the water; and the little ones were transformed into ducks, snakes, lizards, etc., and afterwards changed into the Kok-ko, becoming ancestral gods. The three gentes who lost their children composed the Order of Wood, and this order, after becoming childless, determined to leave their party, and go in search of their beloved priest Po-shai-yan-tka. From this point the Zuñi advanced eastward some sixty miles, locating upon the present site of Zuñi. The present village, however, was built upon the old village after their return from a mesa near by, upon which they lived for a long period, and where extensive ruins are now to be seen.

"The Wood Order, after separating from the Zuñi, took first a northerly course, then easterly, reaching the Rio Grande, and passing down this river till they at last found the home of the much-longed-for father. During this journey they built four villages about equal distance from one another, remaining at each village four years, which words, however, according to Zuñi tradition, refer to periods of time. This order found the home of their father, Po-shai-yan-tka, guarded by formidable sentinels. The first was a mountain-lion decorated with two eagle-plumes, — one attached to

the back of his neck, and one on top of his head. As the order approached, the mountain-lion arose and advanced, angry and growling; but upon the presentation of the plume-sticks, with which the order was provided, and their sprinkling upon him sacred meal, he became gracious, and invited them to enter into the house of his chief. Five other animals, sentinels, had to be propitiated in like manner — the bear, badger, white wolf, eagle, and mole — ere the Order of Wood reached the presence of the great priest. They were welcomed by Po-shai-yan-tka, who told them they must remain with him for a time, and be taught by him. Many years had elapsed since he had separated from his people in the far north-west, and there were many villages surrounding the home of the priest. Po-shai-yan-tka, desiring that others of the Shiwina or Zuñi should also be taught, commanded their presence through his messenger, the Lightning. Upon the arrival of the orders, Po-shai-yan-tka commanded all to gather into groups and listen attentively, for he was about to instruct them in all the medicine songs and dances, the songs to be sung in winter, and the songs for summer. The winter songs must not be sung when the sun was hot, nor must the summer songs be sung in winter time. Each group was provided with a pottery drum, vase-shaped, the opening covered with hide. But one drum-stick, the Nit-tsi-tKi, was used to each drum. This drum-stick was brought from the interior worlds by Po-shai-yan-tka, and, like all articles that came to this world with the Zuñi, is of special value and significance.

"The leader of each group beat upon his drum. All the Shiwina or Zuñi paid special attention, and heard the songs straight, and so remembered them. But the people of the many villages did not hear straight: therefore the songs sung by the Zuñi at the present time are the only authentic songs of Po-shai-yan-tka. He also gave to them all altars of wood and sand, instructing the people how to make them. The medicine and songs came from other animals, but knowledge of the altars sprang directly from Po-shai-yan-tka. In the heart of Po-shai-yan-tka the knowledge of all earthly things originated. The altars were strictly guarded by the animals during the season of instruction, and the people were commanded to have the altars they made guarded in the same manner, the animals assuming relative positions. And since that time these altars have been guarded by stone animals which were once living, but were converted into stone by the great fire that swept over the earth. Trees were likewise converted into stone. The size of the image depends upon the length of time the animal was subjected to the fire: the longer it burned, the smaller it became. Thus these people account for the diminutive size of their animal fetiches. The Zuñi returned to their home, bearing with them the promise of Po-shai-yan-tka's return. Po-shai-yan-tka then commanded the lion to make his home in the north for all future time, as the protector of the north. The bear he sent as protector of the west, the badger to the south, the white wolf to the east, the eagle to the heavens, and the mole to the earth. All other animals he scattered over the face of the earth."

The lack of space forbids giving in this abstract Mrs. Stevenson's exceedingly interesting description of the ceremonials of the different orders. Gaining the entire confidence of the Zuñi, she adopted their dress, painted her face, and witnessed all their secret rites. Speaking of the necromancy or magical arts of the Order of the Ooh-hoo-hoo-ooh-que, she says, —

"One of their tricks is for two persons to draw a rope to and fro across the body of another until it appears on the opposite side. Another is to pass two breast-feathers of the eagle through the flame of a lamp, bringing out two charred bits, and, after manipulating for a time, pressing the bits to their nude breasts, reproducing the feathers in all their original beauty. Mush is made and rolled into small balls, which are passed to the members of the order to eat. The *prestidigitateur* then dips two eagle-plumes in medicine-water, and sprinkled it upward, calling upon the eagle-god of the heavens to convert the mush into stone. The balls are again passed, when they are found to be as hard as stone. Again the plumes are dipped into the medicine-water, and sprinkled to the fire, with the request that the goddess reconvert the stones into mush. Hot water is made cold by the same process, with the feathers, and again heated by calling upon the goddess of fire."

The Wood Order are very clever at legerdemain. Mrs. Stevenson says, "When I first witnessed the swallowing of the knife, I was inclined to think it a ready trick. A youth approached the altar, and dipped the ends of two eagle-plumes into medicine-water, and, after touching his breast with the plumes, he danced wildly before the altar; then he reached behind the altar for his knife, which he held upward while he danced, at times distorting his body, and throwing himself almost prostrate; then he would, with a graceful gesture, turn and suddenly fall on the left knee, immediately in front of the gayly decorated altar, with his back to the altar, he facing the east, and, throwing his head back, run the sword down his throat, leaving nothing but the handle to be seen. This feat was repeated three times, when the eagle-plumes were again dipped into the medicine-water, and touched to the mouth. To convince myself the knife was genuinely put down the throat, after long persuasion, I induced a youth belonging to the order to swallow the knife. This was done in secrecy. The youth removed his head-kerchief, and took off his leather belt and pouch, and, after repeating a long prayer, he placed the knife in his mouth, running it down the throat to the handle. I am told death is sometimes the result, but this is always attributed to a bad heart."

In closing, Mrs. Stevenson said, "The brief account which has been given of the medicine orders of the Zuñi is perhaps sufficient to convey an understanding of this interesting phase of the pueblo life of North America. The dignitary, who is usually called the 'medicine-man' among our Indian tribes, is something more than the term implies in civilization. The medicine-man is both priest and doctor, and, by reason of his priestly office, he sometimes becomes a judge. The mythical beings with whom he holds converse are the gods of his people. They are the persons who bring evils, or preserve from evils: they bring health or disease, they bring peace or war, and they bring plenty or want at harvest time. Thus in all respects the gods are supposed to hold within their power all prosperity and all adversity. So the priests stand between the people and these gods, and by means of ceremonies, incantations, and many prescribed observances, the gods are induced to preserve from evil and bring happiness. The medicine practices of the Zuñi are therefore religious observances and rites; and the daily life of the Zuñi, under the guidance of their priests through the agency of the medicine order, is so controlled that every act of life assumes something of a religious character. To them their religion is fraught with much fear; to them it brings many trials, many privations, and much suffering. Notwithstanding this, they derive from it much amusement and great joy, and in it all their hopes and aspirations are centred."

Early Stages in the Life of Taenia Pectinata.

Thousands of sheep and lambs perish every winter on the ranches west of the Missouri River. They are not apparently afflicted with any disease. They are weak and lean in the fall, and simply seem to be unable to withstand the severity of the blizzards. The Bureau of Animal Industry, of the Agricultural Department, has been engaged in an investigation to ascertain, if possible, the cause of the weakness of the animals that perish, and Mr. Cooper Curtice visited the West in the prosecution of this work. An examination of the viscera of slaughtered sheep and lambs, fat and healthy ones as well as those that were weak and lean, disclosed the fact that they were almost without exception infected with tape-worms, which were found in the duodenum and gall-duct. In the latter they were frequently so numerous as to close it up, and cause a suspension of its functions.

For the purpose of continuing his studies, Mr. Curtice brought from the West a number of lambs, which were killed at intervals and their viscera examined; and this material having been exhausted, and it being inconvenient and expensive to obtain more, he turned his attention during the past winter to a study of the early stages in the life of the *Taenia pectinata* (common unarmed tape-worms of the rabbit). In studying these, Mr. Curtice thinks that he has made some interesting discoveries, which he presented to the Biological Society of Washington at a recent meeting.

The variety examined is found abundantly in nearly all rabbits in this locality. The life-history of the armed tape-worms of man and dogs has long been written; but that of the unarmed species inhabiting our domestic animals, especially cattle and sheep, is as

yet comparatively unknown. As far as has been ascertained, the life-history of the *Taenia pectinata* is embraced in two stages. The first covers the development of the ova into the embryo, which is ready to leave the parent *Taenia:* the other covers the period of growth from the youngest forms yet found in rabbits to the adult stage. The life of the *Taenia* from the time they leave the first rabbit as an embryo, until they are found as young *Taenia* in the second rabbit infected, has as yet been unascertained. Among the theories that have been advanced, is one that they pass this stage upon the ground, are eaten by insects, snails, or crustaceans, and that these are then eaten by the rabbits. This, however, is only a theory, as none have ever been found in snails, insects, or crustaceans.

It was Mr. Curtice's good fortune to find a rabbit which had recently been infected with these peculiar parasites, none of which were over three centimetres in length, many of them being less than five millimetres long. There were more *Taenia* in that rabbit than any he had ever seen before, — about eighty-five. Among the smaller *Taenia* were several specimens that showed the stages of development from non-segmented, armed forms, to segmented, unarmed forms. Mr. Curtice showed to the society specimens illustrating the different stages.

The youngest forms detected were not the smallest, but measured about one-half a centimetre in length. They contained, in addition to the four suckers, a cup-shaped cavity in the place of the rostellum. Around the border of this cup-shaped cavity were situated eighty-five or ninety hooks. The older specimens show a similar cavity, with no hooks. Still older ones show no cavity at all. All of these were in the non-segmented stages; but other forms, some of them smaller, were without signs of hooks, and had already begun segmentation.

Mr. Curtice compared these stages with similar stages in *Taenia serata*, and said that the youngest stage of the *Taenia pectinata* was probably a cysticercoid stage, and not the cysticercal, and that this was indicated by the cup-shaped cavity in the youngest forms of the *Taenia pectinata*.

In discussing the classification founded on the presence or absence of hooks, he declared it to be incorrect, since the discovery described above shows that the unarmed species in adult stages are armed in earlier stages.

The speaker exhibited some elegant drawings made by Dr. George Marx, illustrating the embryo as it leaves the parent *Taenia*. This embryo is six-hooked, and surrounded by a curious pyriform envelope, to which there is a double prolongation surmounted by a cap of the same substance. The cap has a shredded border, and is believed to be the remnants of a mass which, in an earlier stage, completely surrounded the embryo. This peculiar envelope has been previously noticed in Italy by Perroucito, and in France by Raillet. This stage is similar to that found in *Taenia expansa*, the unarmed tape-worm in sheep.

Implanting Teeth.

Dr. Yonger of San Francisco was the first dentist in this country to perform successfully the experiment of implanting teeth. This process is not to be confounded with transplanting teeth, which has been practised by dentists for many years. In the latter operation, a tooth freshly extracted is inserted in a socket from which one has just been drawn, and the parts unite, circulation between the jaw and the tooth is established, and the latter actually takes the place of its predecessor.

In Dr. Yonger's experiment, the tooth to be replaced has long been extracted, and the socket filled up with bony substance. He drills into the jaw, gouges out a new socket, and then, taking a tooth that has long been extracted, cleans it thoroughly, soaks it in bichloride of mercury, and inserts it in the socket just formed. This new tooth in due time becomes firmly anchored, and as serviceable as the original one before it became decayed. Dr. Yonger holds that the tooth is held in its place by the soft tissues surrounding it, and that the artificial socket has nothing to do with anchoring it.

The experiment described above was performed by Dr. G. M. Curtis of Syracuse, N.Y., who afterward extracted the implanted tooth, and sent it to Dr. W. M. Gray, the microscopist of the surgeon-general's office, who has made a very careful examination of it. His experiments prove beyond question that the tooth so implanted is revived, that circulation is established between the socket and the implanted tooth, and that the socket does take an active part in anchoring the tooth. A tooth so implanted is much more firmly anchored in the jaw than one of the originals, and, in the case referred to, the tooth was held so firmly that Dr. Curtis broke it in extracting it. Dr. Gray does not doubt that the soft tissues do take an active part in the operation, but he has proved his propositions in regard to the bone and the tooth beyond all question.

Some Recent Discussions of Target-Shooting.

At the last meeting of the Mathematical Section of the Philosophical Society, Mr. Charles H. Kummell read some remarks on some recent discussions of target-shooting. In opening, he briefly reviewed a previous communication on the same subject which he had made in 1883, stating as the fundamental assumption (there credited to Liagre, but due apparently to Poisson), that the deviations of the shots from a vertical axis, called sighting errors, and those from a horizontal axis, called levelling errors (each axis passing through the centre of the target), each independently follows the exponential law of error. One of the most important consequences of this assumption is, errors of shooting of equal probability are on the circumference of an ellipse whose axes are in the ratio of the mean sighting and levelling errors. Among the writers on the same subject, Mr. DeForrest, in the Transactions of the Connecticut Academy, vol. vii. 1885, requires not only the sighting and levelling axis, but even the centre of the target, to be ignored, and a new centre and system of free axes determined from the distribution of the shots on the given target. Mr. Kummell thinks this method of discussion quite proper, if we really were ignorant of the true position of centre and axes. But, such not being the case, a merely probable thing should not be preferred to a fact.

In the January number of *Comptes Rendus*, 1888, Mr. J. Bertrand objects to the previous methods of discussing target-shooting, on the ground that the levelling and sighting errors are not independent, but admits that in some as yet unknown curve (not an ellipse) would be found shots of equal probability, and proposes to establish one of these curves for any given target by dividing it into a convenient number of sectors, and taking the mean shot in each. Mr. Kummell inquires what this discussion will lead to. It is certainly too rough for a limited number of shots, and whatever curves may be found in any special case, they will be sufficiently near ellipses, as required by Poisson's assumption.

The Drift North of Lake Ontario.

The short paper upon this subject read by Prof. J. W. Spencer before the Philosophical Society at its last meeting was a generalized description of some of the obscure and conflicting phenomena of the drift.

Among the deposits of the later pleistocene period, he said in substance, there is a well stratified, hardened, brown clay charged with pebbles more or less glaciated, resting upon typical blue bowlder clay, north of Toronto. In the Canadian classification of the pleistocene deposits there is no place for this deposit. Indeed, all of the stratified deposits of this region need revision in the light of the progress that has been made in surface geology during the last twenty years. Thus the Saugeen clay is resolvable into three series. The relation of all the clays to the older beaches requires special study, as a part of them probably represent the deep-water deposit of the beach epoch, while some of the later beaches rest upon such clays.

Around the head of Georgian Bay there are ridges in the form of moraines, similar to those about the other Great Lakes, reaching to the height of thirteen hundred to fourteen hundred feet above the sea. From the face of the Niagara escarpment — between Georgian Bay and Lake Ontario — there extends for over a hundred miles, to near Belleville, a broad zone of from eight to twenty miles in width, covered with drift-ridges composed of stony clay below, and frequently stratified clay or sand above, having an elevation of from eleven hundred to twelve hundred feet above the sea, with occasional reductions to nine hundred feet. These 'Oak Hills or Ridges' rise from three hundred to five hundred feet above the flat paleozoic

country to the north. The stones in the clay are glaciated, often of limestone, with only a small proportion of crystalline pebbles or bowlders. In the deposits of the ridges, native copper has been found: consequently the drift-carrying agent moved south-eastward down Georgian Bay, to the west end of the Oak Ridge, and probably throughout its whole length. North and east of Belleville there are many more and fragmentary ridges having a trend somewhat across that of the Oak Ridge.

The glaciation of the region adds great difficulties to the explanation of the phenomena. The striation in the Ottawa valley, from Lake Tamiscamang to the junction of the St. Lawrence, is to the south-eastward, with very rare local exceptions. On the Niagara escarpment, between Georgian Bay and Lake Ontario, from sixteen hundred down to seven hundred feet above the sea, the striæ are also to the south-east; but between these widely separated regions the surface markings of the rocks are obscured to the west and south by drift, and to the north and east are absent and rarely seen, although the crystalline rocks are commonly rounded or very rarely polished, — an absence that can only in part be accounted for by subsequent erosion. About the St. Lawrence and Lake Ontario the striations are to the south-west or west. Between the Ottawa River and Georgian Bay there is a high prominence which divided the drift-bearing currents; but north of Lake Huron the glaciation is very strongly marked, and the direction is to the south-west, with very rare local variations.

All the lobes of glaciation about the Lakes, from Superior to the Ottawa valley, radiate backwards to the broad and open, but low basin of James's (Hudson) Bay. The watershed between the Lakes and Hudson Bay, during the epoch of the formation of the drift, was several hundred feet lower than now, — which is about sixteen hundred feet at present, — as shown by the differential elevation of the beaches.

For these conflicting phenomena of the drift no explanation was offered, but rather sought for.

Some remarks upon the paper were offered by Mr. Gilbert, who had observed the slight amount of erosion in the Ottawa valley; but he thought that generalized explanations of the drift were very often contradicted when applied to special regions, and that our knowledge of the phenomena would not at present give a satisfactory explanation.

Determination of Atomic Weights.

Prof. F. W. Clarke, in a paper on the determination of atomic weights, read before the Philosophical Society at its last meeting, discussed the sources of error in such constants, both with regard to the processes of weighing and to the chemical considerations involved. He dwelt especially upon the uncertainty in the atomic weight of oxygen, which affects the atomic weights of nearly all the other elements, and urged the importance of other determinations which should not hinge upon oxygen. Prout's hypothesis, now of importance in all discussions as to the nature of the chemical elements, requires the most precise determination of atomic weights, and none of the latter are yet known with enough certainty to settle the question at issue.

Distribution of Indian Tribes in North America.

The United States Geological Survey has nearly ready for publication a map showing the distribution of the Indian tribes on this continent north of Mexico. Including the labor which Major Powell himself and his immediate assistants have expended in the collection, arrangement, and digestion of the material for this map, and that done by the Bureau of Ethnology, it will represent the work of about fifteen years, and will be one of the most important and interesting publications ever made by the Geological Survey. All of the Indians living in this country at the time of the white occupation have been divided into linguistic families, and the territory occupied by each one of these families is represented on the map by a distinctive color. The number of these families is about 60, and the number of separate tribes between 300 and 350.

One of the first and most important facts shown by this map is that the territory occupied by each linguistic family, with few exceptions, is continuous. An important deduction in relation to the habits of the Indians is drawn from this fact, — that instead of being nomadic, and wandering over the continent at will, as has been generally supposed, the Indians had fixed homes, the boundaries of which were almost as plainly marked as the dividing lines between the several States are to-day, and that their wanderings were within limited areas, rarely or never extending beyond these fixed boundaries. The Indians had their permanent villages, in which they lived for five, ten, twenty, or perhaps fifty years. At certain seasons of the year they went to the coast or to the rivers to fish, or to the forest or plains to hunt. The boundaries of the territories occupied by each family were occasionally changed by conquest. A stronger tribe or family would by war push back its weaker neighbors, and thus extend its dominion. But the territory so conquered was recognized by the vanquished, as well as by the victor, as the property of the latter. If the Indians had been nomadic, and wandered over the continent or over large portions of it, branches of the same linguistic family would have been found scattered broadcast all over the country.

Some of the few exceptions to this general rule of distribution are exceedingly interesting, and throw a light upon the unwritten and even forgotten history of some of the tribes. For instance: a little colony of the great Siouan family is found in Virginia. How it became separated, crossed the mountains, and maintained itself in the midst of another family speaking an entirely different language, suggests a very interesting topic for the study of the ethnologist. Again: all the north-western part of the continent was occupied by the Athabascan family, very peaceable Indians. But the Apaches and Navajos of New Mexico and Arizona belong to the same family, and are among the most warlike on the continent. To their surroundings and the necessity of wresting their new home from its previous occupants and holding it, as well as to the inhospitable character of the country, may not their change of character be attributed? Another little tribe of the Athabascans is found in California.

One of the most degraded families of Indians of North America is the Shoshonean, of which the Diggers are a branch. And yet, strange as it may appear, the Moquis, more advanced toward civilization than any others of the Pueblo Indians, are Shoshonean.

One exceedingly interesting feature of the map is the great number of little families that lived in California and Oregon. Some of these comprise only a few individuals, — not more than forty or fifty, — and yet their languages are entirely distinct from those spoken by the surrounding tribes. In one instance Mr. Henshaw, who has charge of the construction of the map, found in California a single man, the sole survivor of his tribe. From him enough was learned to preserve the language once spoken by his ancestors, but with his death that tongue becomes extinct.

A very curious fact in relation to the distribution of the Eskimo is that they inhabit the coast of the Arctic regions to the exclusion of other Indians, beginning on the east shore of Greenland, and following the coast-line of that island around to the point farthest north inhabited by man. Then, beginning on the coast on the mainland, they occupy narrow strips on the north shores of Hudson Bay and along the northern coast of the continent, around past Bering Strait, and down the north-west coast of the continent to Prince William's Sound. Throughout all this immense coast-line the differentiation of language is very small; so that an Eskimo from Greenland transported to Bering Strait would in a month be able to speak the language of the natives there as well as though he had been born there. In striking contrast were the numerous distinct families of Indians in the valleys of California and Oregon, whose languages are so different that they could not understand each other.

This map, when published, will be accompanied by a report and discussion of the facts it discloses, and will be a very important contribution to the science of ethnology.

HEALTH MATTERS.

Malaria.

THE subject of malaria has always been a most interesting one for the study of the physician. Until the year 1879 its origin was obscure, although various theories were advanced to account for it. Klebs and Tommasi-Crudeli, in 1879, discovered in the soil of the Roman Campagna a bacillus, to which they gave the name *bacillus malariæ*, and to which they attributed malarial disease. In 1881 Laveran, a French surgeon in Algiers, discovered