tibiale occurs in the tarsus of the recent genera *Cercolabes* and *Erethizon* as it does in that of *Coryphodon;* therefore the presence of this bone must be considered as one of the primitive characters of the skeleton of this extinct group of Ungulates.

The relations of the tibiale facet to the other facets of the astragalus may vary a good deal, and in many cases the tibiale facet appears to be absent, whereas it is really not separated from the navicular facet of the astragalus.

In conclusion, I wish to add that I was led to write this abstract in order to show the numerous variations of the species of *Coryphodon*, and that in this group it is exceedingly difficult to say where one species ends and another begins. In most cases the characters run into each other so insensibly that it is almost impossible to separate the species. However, I believe there are about eight good species of *Coryphodon* whose characters show a progression from the primitive to the more specialized types; this progression and specialization affecting the teeth more particularly, as already described.

American Museum of Natural History, New York.

INDIAN NUMERALS.

BY EDWARD F. WILSON.

IN an essay on "The Origin of Languages," published several years ago by Mr. Hale, the idea is suggested that, as, for example, among our native Indians a family may, while hunting or in time of warfare, have chanced to become separated entirely from the rest of the tribe, father, mother, and elder members of the family may all have perished, and two or three little children have been left alone. Such children, Mr. Hale thinks, would gradually invent a new language of their own, retaining, perhaps, a few words or parts of words of their mother tongue. In this manner, he thinks, may be accounted for the remarkable diversity of tongues among the Indians of the Pacific coast, where among the mountains and forests a family might thus easily become isolated, and the comparative oneness of speech on the great central plains of this continent and in such an open country as Australia.

If there is any good foundation for such a theory as the above, we should expect that the old words retained by these young founders of new varieties of speech would be words of the simplest character and those most often in use in the domestic circle. And, indeed, I think we do find that fire, water, I, you, one, two, three, four, five are the words that generally approach the nearest to one another in a comparison of the different vocabularies.

The North American Indians, as a general rule, count by the decimal system, as do most civilized peoples; but it is noticeable that, after giving a distinct name to each figure from one to five, they, in many of the dialects, seem to commence anew with the figure six, the first part of that numeral sometimes being a contraction, or other form, of the numeral one, and the latter part of the word seeming to point on towards ten. Thus, in the Ojebway we have (1) pejig, (2) nij, (3) niswi, (4) niwin, (5) nanăn, (6) ningodwaswi, (7) nijwaswi, (8) nishwaswi, (9) shangaswi, (10) midaswi. It will be noticed here that from six to ten inclusive the termination is *aswi*. *Ningo*, with which six begins, is another form of pejig (1) never used alone, but only in composition, thus: ningo-gijik, one day; ningo-tibaiigan, one measure. In the Cree language (another Algonkin dialect) the first ten numerals are as follows: (1) peyăk, (2) niso, (3) nisto, (4) né·o, (5) niya'năn, (6) nikotwasik, (7) tepakŭp, (8) ayena'new, (9) keka mita'tat, (10) mita'tat. Here it will be noticed that these Cree numerals resemble those of the Ojebways from one to six, but with seven they branch out into distinct words; then with ten they come together again, mita'tat not being dissimilar to midas'wi, and still more like midatching, the Ojebway equivalent for "ten times." Neither is the Cree numeral for nine so unlike that of the Ojebways as might at first sight appear. Keka mita'tat means "nearly ten," and this suggests that the Ojebway word shangaswi may mean the same, chegaiy or chig' being the Ojebway for near.

The reason for the decimal system being so prevalent all over the world, both among civilized and barbarous people, is doubtless the fact that human beings are possessors of ten fingers, five on each hand. The common manner of counting among the Indians is to turn down the little finger of the left hand for one, the next finger in order for two, the next for three, the next for four, and the thumb for five; then the thumb of the right hand for six, and so on until the little finger of the right hand is turned down for ten. In indicating numbers to others, the left hand held up with all the fingers turned down except the little finger would mean one; that and the next finger to it held up would mean two and so on. In counting by tens they will close the fingers of each hand to indicate each ten, or they will hold both hands up with the palms outward and fingers extended for each ten.

Some Indian tribes in counting resort to their toes as well as their fingers, and thus follow the vigesimal system. The Indians of Guiana, it is said, call five a hand, ten two hands, and twenty a man.

The Dakotas have a peculiar system of their own. When they have gone over the fingers and thumbs of both hands, one finger is temporarily turned down for *one ten*. At the end of the next ten another finger is turned, and so on to a hundred. Opawinge, one hundred, is derived from pawinga, to go around in circles, to make gyrations.

Indians are not generally good arithmeticians. In their native state they have no idea of making even the simplest mental calculation. To add or subtract they will use sticks, pebbles, or other such objects.

To illustrate the manner in which various tribes (some of them of different stocks) count from ten upwards, examples are herewith given from the Ojebway, Blackfoot, Micmac, and Dakota languages: With the Ojebways 10 is midaswi; 11, 12 are midaswi ashi pejig, midaswi ashi nij; 20, 30 are nij tana, nisimidana; 21, nij-tana ashi pejig; 100, ningodwak; 101, ningodwak ashi pejig. With the Blackfeet 10 is kepo; 11, 12, kepo nitsiko'poto; 20, 30, natsippo, niippo; 100, kepippo. With the Micmacs 10 is mtŭln; 11, 12, mtŭln tcel na-ukt, mtŭln tcel tabu; 20, 30 are tabu inskääk, nasinskääk; 21, tabu inskääk tcel na-ukt; 100, kŭskimtŭlnakŭn; 101, kuskimtŭlnakŭn tcel na-ukt. With the Dakotas (or Sioux) 10 is wiktcemna; 11, 12, wiktcemna sanpa wanjidan (10 more one), wiktcemna sanpa nonpa; 20, 30 are wiktcemna nonpa (ten two), wiktcemna yamni; 21, wiktcemna nonpa sanpa wanjidan (ten two more one); 100 is opawinge, meaning a circle.

In some of the Indian languages there is more than one set of the cardinal numbers. Animate objects may be counted with one set, inanimate with another. They may have a particular set for counting fish or for counting skins; perhaps a set for counting standing objects, and another set for counting sitting objects, etc.

To give a few instances in the Ojebway tongue: nanan, 5; nanominag, 5 globubar, animate objects, as turnips, seeds, etc.; nanonag, 5 boats or canoes; nanoshk, 5 breadths of cloth; and nanoshkin, 5 bags full (nūshkin meaning full); nanosag, 5 things of wood; nanwabik, 5 things of metal. In the Zimshian language (Brit. Columbia) guel means one if the object is neŭter, gaul, if masculine or feminine, gouuz-gŭn, when the thing is long like a tree or pencil, ga'at, if a fish or animal is spoken of, gŭmmet, if applied to a canoe; the other numerals change in the same way.

It is interesting to note that in the Ainu, the aboriginal language of Japan, a distinction is made in the numeral according as the object spoken of is animate or inanimate, thus: shinen, one person; shinep, one thing; tun, two persons; tup, two things.

Sault Ste. Marie, Ontario, June 22.

BLACK KNOT.

BULLETIN No. 40 of the New York State Experiment Station at Geneva (Peter Collier, director) contains a valuable summary of our present knowledge concerning this pest, from which the following is abstracted: —

The "Black Knot" is a disease of plums and cherries, which causes the formation of a hard, rough, black, wart-like surface on an enlarged or distorted outgrowth of the bark. The following statements, furnished by Mr. P. Groom Brandow of Athens, Green County, N.Y., indicate the former extent and value of the plum industry in that region and its total devastation by the Black Knot.

He states that, beginning at Cedar Hill, about four miles below Albany, the plum district included a belt about three miles on each side of the river and extended southward about thirty-six miles to Germantown. He began setting plums for a commercial orchard in 1861, and at one time had six thousand trees. Two of his neighbors each had about two thousand trees, and most of the farmers went into the business to a greater or less extent. It was no uncommon thing for a steamer to carry from one hundred to five hundred barrels of plums to New York at one trip. For four days' picking in one week he received $1,980. In 1884 he netted $8,000 from his plums, and the next year he rooted out over five thousand trees on account of the Black Knot. From twenty-five hundred young trees two to three years old, left at that time, he thinks he has not yet realized over $250.

It was formerly believed that Black Knot was produced by some gall insect, and it is not strange that this opinion prevailed on account of the gall-like character of the knots and the fact that they are frequently infested by insects. Some believed it to be the work of the curculio, others thought that it was not the curculio, but some other insect or cause that produced the knots. But several years ago Dr. W. G. Farlow published, in the first annual report of the Bussey Institute, the results of his investigations, which proved conclusively that the Black Knot is caused solely by a parasitic fungus which grows within the bark, and which is now known to science by the name of Plowrightia morbosa. It is recognized as growing on cultivated cherries, and also on the wild red or yellow plum, the Chicasaw plum, the choke-cherry, the wild red cherry, and the wild black cherry. It is commonly most destructive to the plum, but also seriously attacks the cherry.

The external appearance of the mature form of the Black Knot is generally well known. It appears at this stage as a rough, wart-like excrescence, or distorted outgrowth, from the bark of twigs and branches, and in severe cases may extend along the trunk for several feet. The first outward sign of the formation of a new knot is seen in a swelling of the tissue within the bark either in the fall or during the growing season of the tree. The swelling increases till the bark is ruptured, and over the surface thus exposed the fungus sends out numerous threads (hypæ), which produce a velvety appearance and are of an olive-green color. Microscopic examination of the velvety surface reveals multitudes of newly formed and forming spores borne on these upright threads. These spores (conidia) are called summer spores. When full grown they drop off from the supporting threads, and when carried by winds, insects, or other agencies, to another host-plant, under favorable conditions they may start growth and form a new centre of disease, from which in time other trees may also be infested, and thus spread the disease from tree to tree and neighborhood to neighborhood.

The best way to deal with thoroughly infested trees is to cut them down and burn them at once, thus insuring the destruction of the spores before they spread the disease any further. Trees not badly infested may be treated by cutting off affected branches some distance below the knot. This operation is best performed in the fall immediately after the foliage drops, because the winter spores are not formed at that time and consequently there is less danger of their being disseminated in the operation, and also because the work can be done more thoroughly when there are no leaves to hide the knot. The summer spores must also be taken care of in their season. As soon as there is any indications of the formation of a new knot, in the spring or during the summer, the branch on which it occurs should be cut and burned. The first outbreak will probably be noticed about the middle of May.

It is important to note that if a branch containing the knot be cut from the tree and thrown on the ground, the spores will ripen in due time just the same. Therefore the practice of collecting carefully and burning every knot cannot be too strongly urged.

The bulletins of the Massachusetts Experiment Station contain some experiments in the application of various substances for the purpose of destroying the knot. Kerosene, turpentine, linseed oil, sulphate of copper, and a mixture of red oxide of iron and linseed oil are mentioned among the substances tried. These seem to be effective in destroying warts to which they are applied to saturation, but care must be used with the turpentine and kerosene or the entire branch will be killed.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

A Plea for the Study of Psychology.

THE perusal of a report, written by a member of the visiting committee of one of our universities, induced me to write these lines. In the course of the report, the remark is made that the study of psychology is difficult, and therefore few students take the study. The importance and advantage derived from studying a subject are to be considered more than its difficulty. Its usefulness is determined by its educational value; and surely there is no subject of study more useful and beneficial than psychology; for all persons who deal with people require a knowledge of this subject.