

HABITS OF SNAKES.

We publish elsewhere an article by Mr. G. R. O'Reilly, of the Royal Zoological Society of Ireland, who has recently come to this country after extensive travels through the wilds and jungles of South Africa, South America and the West Indies. He has been traveling in search of snakes and reptiles, with the view of studying their nature, and he has formed a large and interesting collection, which he has brought with him to this country. With his kind assistance we have procured some interesting instantaneous photographs of the position assumed by some of the more characteristic varieties of snakes when coiled either in sleep or in anger. Each picture is a study from life and an exact reproduction from nature.

The coils of many snakes when in repose and when on the defensive are exactly similar, and it is very difficult to tell whether or not a snake is asleep, from the fact that the eyes seem always open. They are closed by drawing the epidermis like a film over the eye, but no external change is perceptible to the casual observer. If the engraving of the fer de lance is examined, it will be observed that there are two black spots on the head that appear to be eyes, but a more careful examination will reveal the true eyes higher up in the head and quite separated from each other. The black spots are "the pits" or hollows in the sides of the snout, and, strange to say, their function is a mystery to the naturalist.

Mr. O'Reilly handles the snakes with freedom, although the greatest care must be observed in handling such venomous serpents as the labarri, the rattler, the moccasin, or the fer de lance. In collecting snakes he simply uses a long pole with the end bent at an angle of about 45°.

This is laid over the back or neck of the victim, and when once he is firmly pinioned to the ground, the hunter gradually approaches and seizes him about the back of the neck. Once firmly held in his grasp, the snake is thrown over the shoulder, and the prisoner is allowed to coil about pretty much as he chooses. Care must be taken not to allow the grip on the neck to be relaxed or there will be trouble. None of the snakes in this collection has been mutilated by the extraction of the fangs.

As stated elsewhere, the labarri is one of the most subtle and deadly of serpents. Fearless, he will not retire before the approach of man, and will strike with deadly aim and without warning. Our rattlesnake seems almost harmless in comparison, as many a life has been saved by the unintentionally friendly signal of warning.

The object of the rattle has always been a puzzle to the naturalist. It is hardly to be conceived that Providence, that is so kind in providing various living creatures with weapons offensive and defensive, should have furnished the rattler with an organ for warning off the very objects of its prey. Nor is it natural to suppose that it would still cling to a habit that apparently has lost him many a dinner. This is explained partly, perhaps, by the fact that the rattling is almost always the nervous vibration of the tail, caused by fear or anger, which movement is characteristic also of the labarri, the fer de lance, and other varieties, as explained elsewhere. Of course with the latter no sound is produced.

It is doubtful whether the rattle comes into play ordinarily, when the reptile is in search of food, unless he is suddenly startled or disturbed. During the very wet seasons, the rattles sometimes become soaked with water, and no sound is given out. At such a time he is particularly dangerous. Furthermore, in the tropics insects of the cicada kind are frequently found whose characteristic sound is so similar to that of the rattler that the warning of the latter is of little avail, as it is lost as a signal in the confusion of noises that fill the forest.

Uses of Concrete in Jamaica.

I was in the island of Jamaica a few months ago, where there is very little, if any, good building stone, and concrete is used to a very large extent.

The Jamaica Railway Company were then building an extension of their line, and I was invited to examine the works. Away up in the mountains they were building concrete pipe culverts, of 4 feet diameter and over, and they were doing it in a very successful way. I was much interested to see how easy it was to do what with us at home has generally been considered not feasible. Here, when we use pipe culverts for railroad work, we usually employ extra heavy earthen sewer pipe or cast iron pipe, either of which is costly, and often difficult of transportation, but there they were easily and swiftly building the culverts right at the site. They had a portable platform which could be brought quite near, on which were ranged a number of spacing blocks conforming to the circumferences of the inner and outer frames of cylindrical wooden moulds. The frames were placed vertically on the platform, secured firmly at the bottom by the spacing blocks, and clamped together at the top, the proper gauge being maintained by double wedges between the two halves of the inner frame; the concrete, com-

posed of cement, sand, and gravel, was poured in and rammed. After sufficient time had been allowed, the wedges were removed, and the inner frame taken out, just as centers are struck, and then the outer frame could be lifted off. The same platform could, of course, be used for various sizes and several sections of pipe at one time, and could readily be moved along from place to place; although the whole operation was being performed by negro laborers, there was nothing wanting either in strength or smoothness of the finished pipes. If I remember correctly, they had a rough rule of 1 inch thickness of pipe for each foot of diameter. The ease and cheapness with which the cement can be transported, compared with manufactured pipe, would recommend this form of construction, even if the actual first cost of material also was not less; in this case the chief cost was in the cement, sand and gravel being generally found close at hand.

I was also shown a very heavy retaining wall, 20 feet or more in height, on the concave side of a sharp bend of the River Cobra, built to support the railway embankment where exposed to the full effect of formidable freshets; the wall was entirely of concrete from toe to coping, and had been in service for several seasons with absolute perfection.

Concrete is used in Kingston for architectural purposes to an extent we do not dream of here. They use it for arches, retaining walls, colonnades, the walls of houses, stairways, of which the entire structure of supporting members and treads is a homogeneous body of fine concrete, and, generally speaking, wherever we would use stone; the quality is very strong, hard, and enduring.—J. Foster Crowell, *Trans. Am. Soc. Civil Engineers.*

The Classification of Applications and Patents in the United States Patent Office.

Under the patent law of the United States, a thing to be entitled to protection by letters patent must be new and must possess invention.

Most things which are new are the result of the exercise of the inventive talents, and are therefore patentable.

To determine the novelty of a device for which a patent is solicited, and hence the patentability of the same, it is provided by statute that the Commissioner of Patents shall cause an examination to be made of all previous patents relating thereto, or, as it is commonly termed, of the "state of the art."

This examination, when completed, is supposed to remove all doubts as to the novelty of the thing in question and to determine its patentability.

This examination, to be thorough, depends upon two things—the skill and honesty of the members of the examining corps and a proper classification of inventions.

A proper classification should be of such a character that the officer whose duty it is to assign applications for examination may be able to determine, by a careful inspection thereof, its proper place in the arts and to what class and division it should be assigned.

While the classification now in vogue is conceded by all to be the best which has yet been devised, to any one who has carefully considered the matter it must be apparent that it has many defects and is open to improvement in many particulars.

Under this classification, applications and inventions are assigned for examination with relation to the particular specific art to which they are more closely allied.

Those inventions relating to the manipulation of metal are sent to the class of metal working; those relating to the mechanical treatment of paper to the class of paper manufactures; those relating to the treatment of leather to the class of leather working, and so on throughout the office.

An application for a patent for a machine for rolling sheet metal is assigned to the division of metal working; one for ironing cloth is sent to textiles, while one for ironing or rolling leather is sent to leather working, notwithstanding that in most cases these machines are analogous in construction and operation and can be interchangeably used.

As the courts have decided that an inventor is entitled to all the uses to which his invention can be put, a machine which has once been patented for one purpose cannot be again patented for another purpose. A machine for rolling metal or cloth can generally be used for rolling leather.

Under the present classification, these three classes of machines are in three different divisions of the office, so that to be certain that a machine of one of the classes is new, a search therefor must be carried on in each of the respective classes or divisions wherein the others are classified.

These classes are in different rooms in the Patent Office and are widely separated, on different sides and different floors of the building, so that an examiner who may be prosecuting a search for a machine of the kinds mentioned must tramp around the office from room to room and floor to floor of this great building in order to make a thorough search, consuming much valuable time in his pilgrimages, and, perhaps, being

unfamiliar generally with classes other than his own, his search is rendered difficult and uncertain.

This classification undoubtedly lends an air of uncertainty to the search and to the novelty of many things, for if the examiner be a recent employe, and be therefore ignorant of the existence of analogous classes, or if he be careless, and thus through ignorance or carelessness fails to make an examination therein, duplicate patents are liable to be, and as a matter of fact are, granted.

Fortunately, the members of the examining corps are generally capable and painstaking men, who are alert and careful in the performance of their duties, protecting equally the interests of the inventor and the public, and to this fact is due the very few duplicate patents in the many thousands issued yearly.

Another defect in the present classification, and one which cannot be too strongly condemned, is the facility with which an applicant or his attorney can practically determine in what class his invention shall be examined and to locate the same therein.

The assignment of the application is, in most cases, determined by the title which is given the alleged invention or the statement of invention contained in the specification.

Let us assume, for an example, that a man has invented a machine for cutting fabric, either cloth, leather, or paper, and for some reason he desires this machine to be examined in the class of paper manufactures.

There are many reasons why he may desire this; he may be in a hurry to get an action on his case and this division may be farther advanced in date than another, or the examiner in this class may be known to have more liberal views than another; in this case, he simply styles his machine a machine for cutting paper, when his object is obtained, the case is assigned where he wants it to go. The same is true throughout the office. A machine for riveting sheet metal is assigned to metal working, but the same machine, if called simply a riveting machine, and the statement of invention should set forth that it was adapted to insert rivets in leather and other sheet material, would be assigned to the class of leather working.

Under the present classification, one division patents knives; another patents hay knives; another shoe knives; another woodworking knives, and still another knife erasers—five separate divisions granting patents for knives.

There are at least three divisions patenting tacking and nailing machines, differing only in the material into which they drive the tacks or nails.

There are at least three divisions patenting chains, links, etc.

Is there any wonder that duplicate patents are sometimes granted?

The remedy for this state of affairs lies in the adoption of a classification which shall classify according to mechanical constructions and the generic functions of machines and devices.

Thus machines for cutting fabric, whether cloth, leather, or paper, would, under this classification, all be assembled in one division or class. All riveting machines, no matter upon what material they operate; all knives; all pegging and nailing machines; all rolling machines; and all chains, would be classified under their respective generic classes, such as cutting machines, riveting machines, nailing machines, knives, chains, etc.

This classification would result in the grouping of inventions of analogous constructions and generic functions in a single division of the office and would reduce to a minimum the possibility of issuing duplicate patents. This would arise from the fact that, these generic devices all being in one division, the examiners would become more familiar with them, resulting in more certain and thorough examinations being made.

The time now spent by the examiners running around to many different divisions would be saved and utilized in the work of examining, thus materially aiding the advancement of the work of the office.

Of course it is realized that it would be almost impossible to devise a classification which would entirely do away with the overlapping of the classes, but the one suggested, it is thought, would reduce such overlapping to a very small per cent.

A change must at some time be made, for it is becoming more difficult every year, with the enormous increase in the issue of patents, to make thorough examinations.

It is realized that any change must necessarily be made gradually, in order not to greatly interfere with the work of examination; but with a competent force it could be done in a comparatively short time without retarding the work of the office.

T. H. A.

THE magnetic needle points in the same direction as to the magnetic poles in all parts of the earth. The magnetic poles do not correspond with the axis of the earth, which makes a variation of the needle at places not on a meridian which coincides with both poles. The needle is never inverted, but dips as it approaches the magnetic poles.