

Spiders and Ants—Island of St. Thomas.

A large ground spider (*Lycosa*) is very abundant in the island, inhabiting a hole in the ground about six inches in depth and from half an inch to an inch in diameter, and with a right angled turn at the bottom to form a resting chamber for the spider. Some negro boys dug the spiders out for me. They said that their bite was poisonous, and that they fed on lizards, leaving their holes at night to search for them.

The boys soon grubbed one out with a knife, a great heavy venomous-looking brute about three inches across. It bit savagely at my forceps. The holes of these spiders were so common that on one tolerably clear patch of about an acre in extent they were dotted over the entire area at about one or two feet distance from one another. I noticed the holes at once, and was astonished when the boys told me they were spiders' holes.

A species of white ant (*Termite*) is very common, which makes large globular nests as much as two feet in diameter, and which are perched high up in the fork of a tree. The nests are made of a hard brown comb. From the bottom of the tree covered galleries, about half an inch in breadth, lead up on the surface of the bark to the nest, looking like long narrow brown streaks upon the trunk of the tree. The galleries usually follow a somewhat irregular course up the trunk to the nest, reminding one of the curious deviations which are always to be seen in foot-paths cut out by people walking across fields, in their endeavors to go straight from one point to another. The galleries, or rather tubular ways, for they have bottoms to them, are made of the same tough brown substance as the nests, and are cemented firmly to the bark. Though they are so broad in order to allow numerous ants to pass and repass, they are only high enough for the ants to walk under. I broke one of these galleries, and a number of soldier termites came out and began biting my hands, hardly making themselves felt, but as brave as if they had a sting. I had to break a considerable length of the gallery before I got to any of the working termites, as they had retired from the scene of danger.

A species of peripatus is found in St. Thomas, but I did not succeed in meeting with any. An agouti, a species of rodent (*Dasyprocta*) occurs in the island, and Mr. Wyman told me that it was common in the gullies near his sugar plantation.—H. N. Mosely, "Notes by a Naturalist."

THE CYCLODES.

The cyclodes are so called on account of their teeth, the crown of which is rounded, and which reminds of the sharp and cutting teeth of other reptiles that belong to the same class. The cyclodes have a large round trunk, which diminishes regularly from the neck to the extremity of the tail. The tail and body form one piece. The snout is blunt and the tongue is flat, is covered with scales, and has the shape of a lance, with an incision at the end. The eyes are oval and oblique, and are behind the mouth. The neck is very short and narrow. The body is covered with smooth scales arranged like a coat of mail. The claws are small in proportion to the size of the body. The fingers are short, plump, and nearly cylindrical. Three species of cyclodes are found in New Holland—the cyclode of Casnarina, the black and yellow cyclode, and the cyclode of Boddaert.

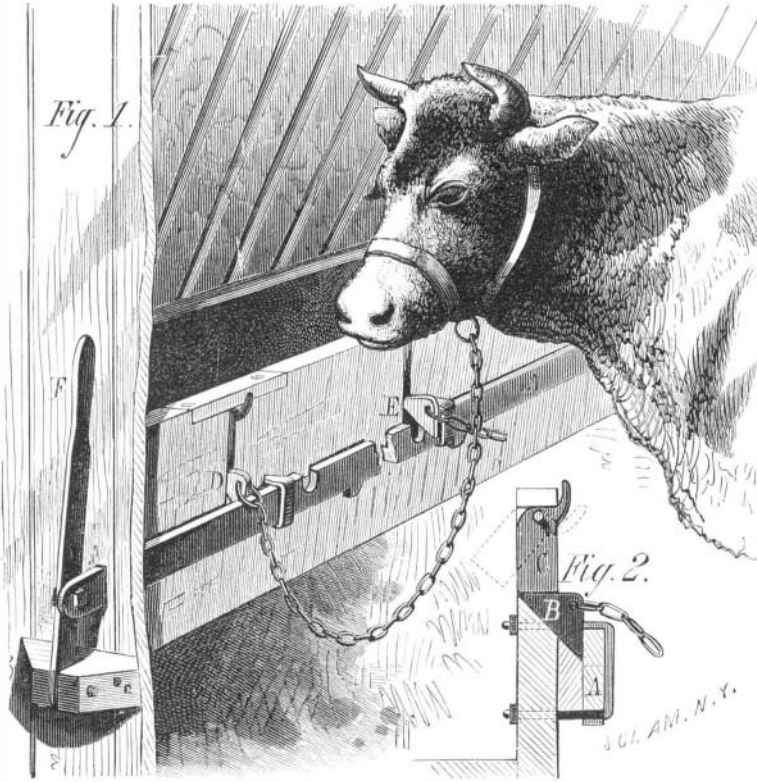
The giant skink, or the cyclode of Boddaert, is shown in the engraving. It has a more elongated head than the other two species. The upper part of the body is marked with transverse alternating fawn colored and brown stripes. Sometimes these stripes pass down the sides, when the brown or black ones are covered with large yellow spots. Back of the eyes there is a dark stripe which extends as far as the shoulders. In some of the animals the top of the head is reddish, while in others it has a black border. This species attains a length of about fifteen inches.

Like most of the skink family it is very slow in its movements and will lie for hours perfectly immovable, and generally prefers warm and obscure places. While walking the belly drags along the earth, for the legs are short and too feeble to support the body. It lives on pulpy fruit, small animals, and young birds.—*La Nature.*

FASTENING AND RELEASING DEVICE FOR CATTLE STALLS.

The practical value of inventions of the class represented in the accompanying engraving can scarcely be overestimated. The frequency of fires and accidents which imperil cattle and horses imprisoned in stalls, has rendered something of this nature an absolute necessity, and its convenience in every day use is worthy of consideration.

The front board of the troughs, or the head walls of a series of stalls, are all arranged in line, and a horizontal continuous bar, A, extends through all of the stalls, and is supported by staples or keepers, and provided with a stop pin



WATTERS' FASTENING AND RELEASING DEVICE.

which limits its motion. In the head wall, or in the front of the trough in each stall, there is a vertical recess having an inclined bottom running out into the stall. In the upper part of this recess is pivoted a gravity catch or detent, C, which extends downward into the recess just far enough to leave a triangular chamber for receiving the triangular bit, B, which is attached to the end of a chain or rope about the animal's neck. This arrangement is clearly shown in Fig. 2. It will be noticed that the bar, A, extends along in front of the recess which contains the bit, B, and in conjunction with the gravity catch retains the bit.

In the bar, A, there are notches corresponding in position with the recesses in the troughs, and at one end of the bar there is a lever, F, by which it may be moved longitudinally.

There are two ways of releasing the animals. If only a portion are to be released, or if it is desired to release them separately, it may be done by throwing up the gravity catch as shown in dotted lines in Fig. 2. When it is desired to

This device has met with the approval of farmers' clubs and farmers who have examined and tested it. Further information may be obtained from Mr. James D. Watters, of Bel Air, Md.

Experiments in Cross-Breeding Plants.

Professor W. J. Beal, desirous of testing the accuracy of some of the statements in Darwin's work, "The Effects of Cross and Self Fertilization of Plants," has been making some experiments, the results of which he records in the *American Journal of Science and Arts*. His first experiments were with Indian corn. Yellow dent corn was obtained from two men in different parts of Michigan. In one case the corn had been kept ten years or more on the same farm, and in the other instance fifteen years or more on the same farm. In both cases the corn was much alike. The two lots were planted in alternate rows in a plat by itself. The tops of one set of rows were all cut off, thus securing a perfect cross on those stalks. Seed from this cross was saved and planted to compare with corn not so crossed. The yield from the crossed seed exceeded the yield of that not crossed, as 153 exceeds 100.

The next experiment was with black wax beans, a variety much cultivated for the purpose of supplying an early crop, and a kind that may be eaten, pod and all, while young. Eight rows were planted, alternately old and crossed stock, and fifteen beans planted in each of the rows. This was on May 31, 1878. On the 22d of July the pods on the two lots of plants were about alike in size, but those fit for cooking numbered 108 on the old stock, and 353 on the crossed; a difference of over three to one in favor of the crossed stock. On August 9th the pods fit for cooking, or past that condition, were 883 on the old stalk and 1,048 on the crossed. On or before the 16th of September all were harvested. The total number of pods was found to be, on the old stock 818 and on the crossed stock 1,859. The beans of the old stock weighed 29.77 ounces, while those of the crossed stock weighed 70.33 ounces, or nearly in the proportion of 100 to 236. Six lots of fifty beans each were taken at random from the old stock, weighed, and the average for fifty found to be 269½ grains. A like experiment with the crossed stock gave an average of 213½ grains. The average weight of an equal number of beans from each stock was nearly as 100 to 79 in favor of the old stock.

Poisonous Properties of Laburnum.

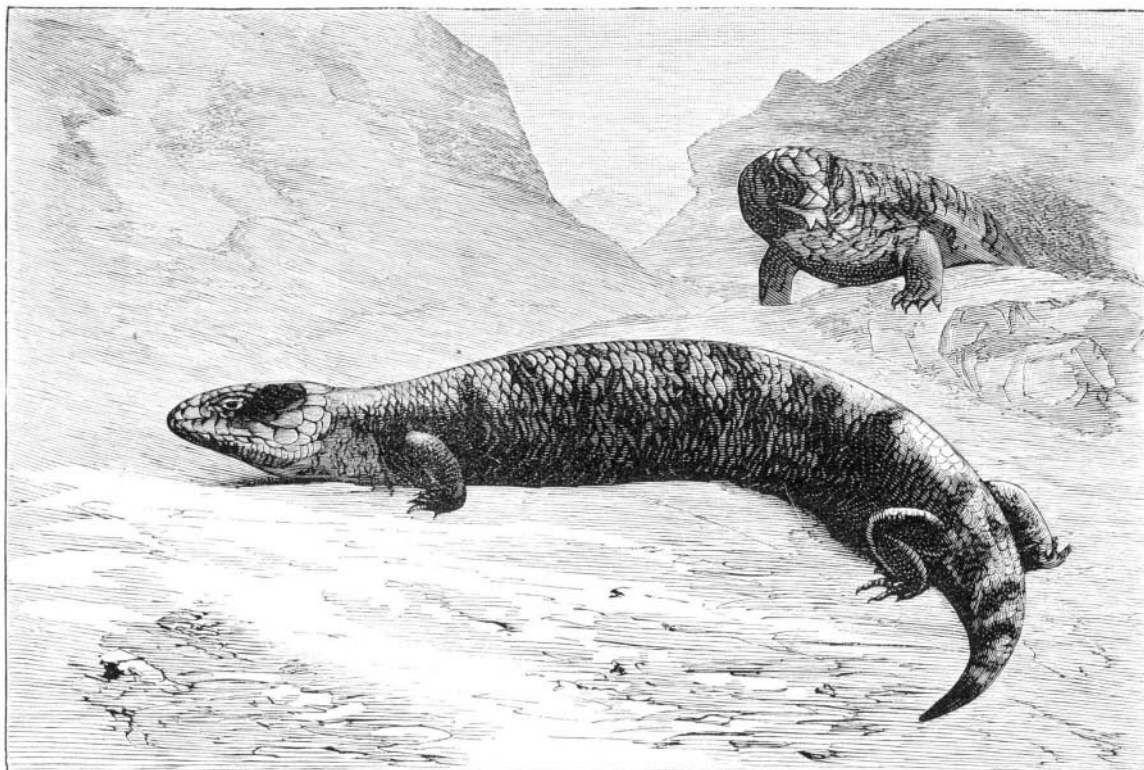
The laburnum (*L. vulgare*), a small ornamental leguminous tree very common in our gardens under the name of "golden chain," is quite a favorite with both young and old on account of its being an early bloomer, as well as because its flowers are very pretty.

A writer in the *Gardener's Chronicle* calls attention to the fact that the seeds of this plant act so violently as an emetic that they are justly deemed poisonous, but it seems very little known that all the parts of this tree—leaves, flower pods, and even the bark and roots—are highly dangerous and contain the *cytisin* discovered by Husemann and Marne in 1864.

A dose of 0.03 of a gramme injected under the skin is sufficient to cause the instantaneous death of a dog or a cat. Dr. Christison was the first who observed the fatal poisoning of a man by *cytisin*, and more than a hundred cases of poisoning by this alkaloid, of which the majority were fatal, have been recorded in medical literature. Children particularly, who had eaten of the pods or seeds of laburnum (ten seeds kill a child), but also adults who by mistake had taken flowers of this plant instead of false acacia to prepare a tea, were dangerously affected. The symptoms of this kind of poisoning are not at all characteristic, and unfortunately no antidote is as yet known for it.

Japanese Cement.

Mix the best powdered rice with a little cold water, then gradually add boiling water until a proper consistence is acquired, being careful to keep it well stirred all the time; lastly, it must be boiled for one minute in a clean saucepan. This glue is beautifully white and almost transparent, for which reason it is well adapted for fancy paper work, which requires a strong and colorless cement.



CYCLODE OF BODDAERT, AT THE JARDIN DES PLANTES, PARIS.

loosen all of the animals as quickly as possible, as in a case of fire, the bar, A, is moved longitudinally by means of the lever, F, bringing the notches in the bar opposite the bits, B, as shown at E (Fig. 1), permitting all of the animals to escape simultaneously.

The Steamship Scotia.

Many of our people, from having frequently crossed the Atlantic in the steamship Scotia, the last side-wheel steamer built for the Cunard Company, will be glad to know what has become of their favorite vessel. A foreign contemporary gives the following account of her:

"Few would recognize in the large twin screw steamer which left the Mersey lately, the once famous Cunard liner Scotia, the last of the great paddle steamers built for the Atlantic trade, and which, under the command of the late Captain Judkins, was for years looked upon as the fastest and favorite vessel on the line between Liverpool and New York. The Scotia was built in 1862, when, with the exception of the Great Eastern, she was probably the largest mail steamer afloat, being about 400 feet long over all, 47 feet 8 inches beam, and 4,050 tons builder's measurement, and fitted with a pair of side lever engines of 1,000 horse power. The introduction of screw steamers fitted with compound engines for the Atlantic and other ocean voyages has, of late years, entirely superseded the paddle steamers, and a few years back the Scotia was withdrawn from the Cunard Company's sailing list, and was subsequently purchased by the Telegraph Construction and Maintenance Company to be employed in their cable-laying operations. Extensive alterations were made by Messrs. Laird Brothers, at Birkenhead Ironworks. The Scotia has been stripped of her masts, funnels, machinery, paddle wheels and paddle boxes, deckhouses, etc.; she has also been raised by the addition of a spar deck, and altered about the after end to prepare her for twin screws, and has been fitted with new compound engines, and also provided with three immense cylindrical tanks in which to stow the electric cable, as well as with most elaborate and approved steam machinery for paying out and hauling in, also steam capstan, steam steering gear, winches, etc. The new engines are two distinct sets, on the compound system, with inverted cylinders, 38 inches, and 66 inches diameter, and 3 feet 9 inches stroke, supplied with steam at 75 lb. pressure from three double-ended cylindrical boilers, and are calculated to drive the vessel at a speed of about 11½ knots an hour

THE ELECTRIC PEN.

Our engraving, which we take from *La Nature*, represents a new electric pen devised by Messrs. Bellet & Hallez d'Arros, who deserve credit for having remedied several imperfections which existed in the first instruments made on this principle.

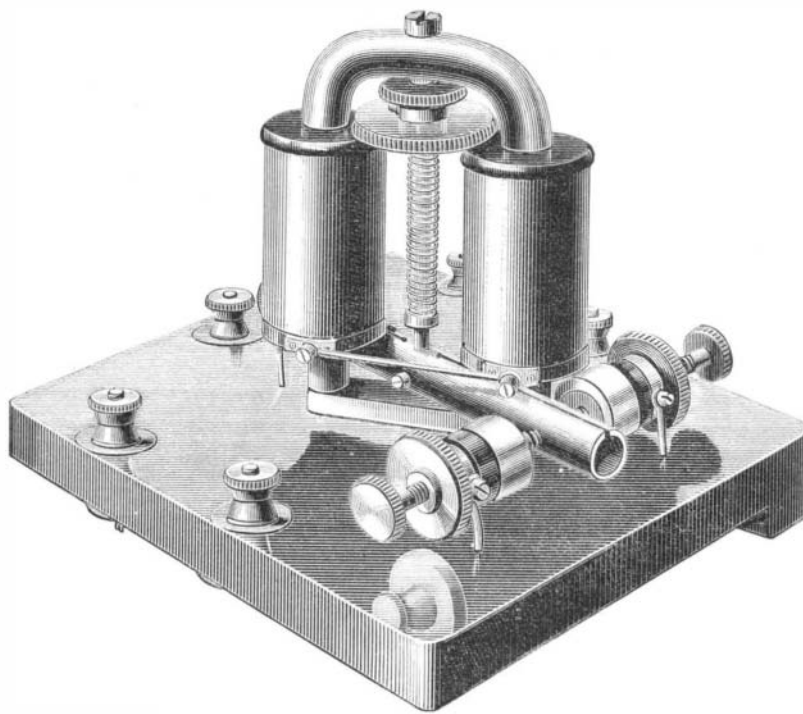
This pen was suggested by the familiar experiment of piercing a card by the passage of an electric spark from a Leyden jar. The spark of an electric machine or an induction coil passing between metallic points or between a point and a conducting body is capable of piercing a card, and will, of course, much easier puncture a sheet of paper. When the sheet of paper rests upon a metallic plate and the surface is traversed by the electric pen, the plate and the pen being connected with the poles of an induction coil, a line may be produced by a series of very fine perforations, which will vary in number in a given space with the rapidity of the discharges and the rate of the movement of the pen. The principle of the pen is very simple, but before the practical utilization of it was reached, many difficulties had to be surmounted. Among these we may mention the tendency of the sparks to burst forth, when the pen is within a short distance of the paper, puncturing the paper in all directions, making it impossible to draw a clear line from the start. The operator was also liable to severe shocks. Another difficulty was the distance between the successive perforations. These imperfections have been overcome by Messrs. Bellet & Arros, by reducing

the strength of the secondary current, so that it has only sufficient power to pierce the paper, and will not, therefore, give a perceptible shock. The paper which is to form the stencil is dipped in a solution of salt and dried; this operation prevents too many sparks from issuing from the pen, and insures an absolutely true and clear line. The interrupter is of novel form and is operated by the magnetized core of the induction coil. The apparatus forms a desk of me-

dium dimensions. At one side of the desk there is a plunging bichromate battery; the induction coil is placed in the middle and is connected by one of its wires with the lead of an ordinary lead pencil, which serves the double purpose of making a visible mark on the paper and of conducting the current. The metallic plate which supports the paper is also connected with the coil and is secured to the desk top. When it is desired to take an impression from the stencil it is placed over a sheet of paper, and rolled with printer's ink reduced with a little printer's varnish or with castor oil.

A NEW SOUNDER.

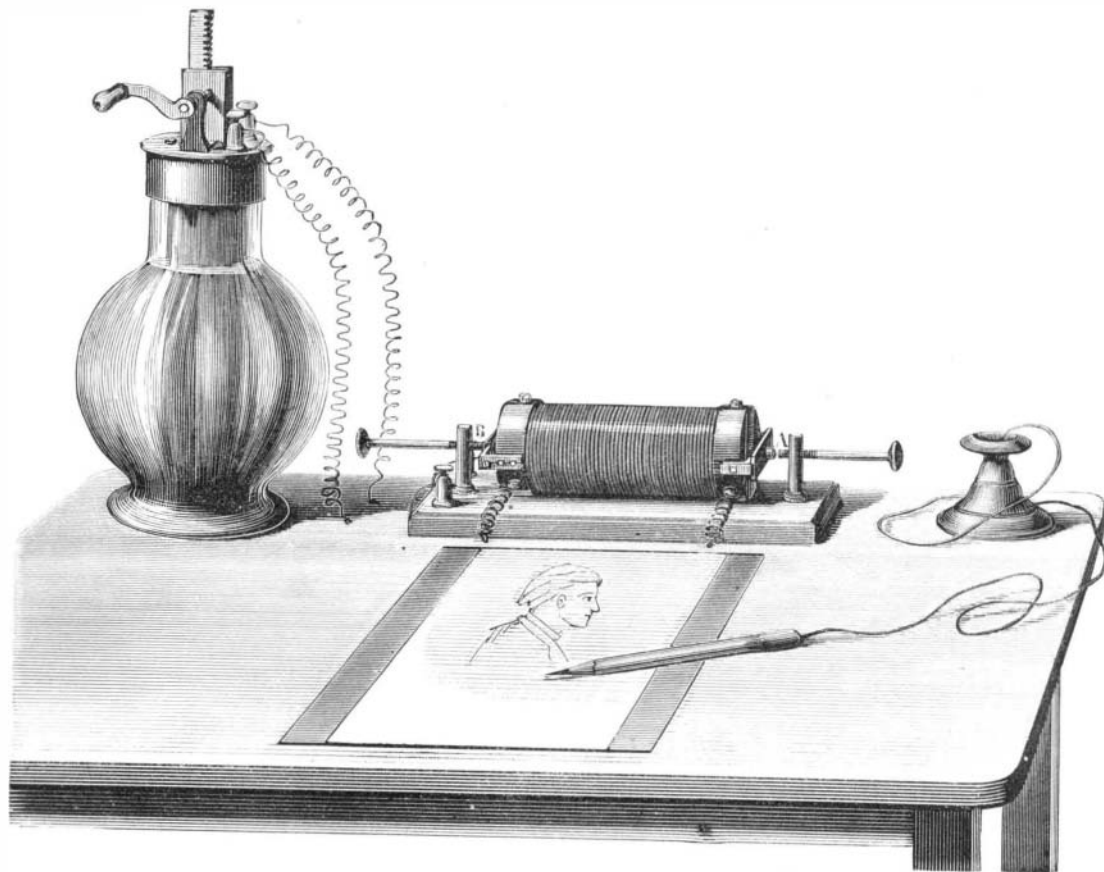
The accompanying illustration represents a sounder for direct working or translation, and of which over one hun-

**A NEW FORM OF SOUNDER.**

dred have been constructed for the telegraph lines in India.

It differs from an ordinary sounder in the arrangement of the armature, which is supported by a vertical spiral spring. This spring serves to restore the position of the armature when the current ceases, as well as to relieve the lower bearing of nearly all friction. The prolongation of the armature acts as the beam, and plays between the two stops shown in the engraving.

To insure very good insulation for damp climates, the coils are rendered solid by repeated immersions in a compound of resin and beeswax (for hot climates, ten parts of resin and

**NEW ELECTRIC PEN.**

one of wax answers well). The range of the instrument is shown by its working without fresh adjustment, either with one Daniell's cell through 6,000 ohms or with 20 through 0. When very delicately adjusted, one Daniell's cell through 31,000 ohms is just able to work the instrument if the stops be extremely close together. —G. Dubern, in *Journal of the Society of Telegraph Engineers.*

NEW AGRICULTURAL INVENTIONS.

An improvement in the class of churns having a reciprocating dasher which is operated by a spring motor, has been patented by Mr. W. L. Allegru, of Hebbardsville, Ky. This improvement relates to the construction of the churn cover, which is composed of two separate disks, the lower one being designed for gathering the butter.

An improved churn dasher, constructed so as to give the milk a continuous rotary motion as the dasher is moved up and down, has been patented by Mr. Seth K. Warren, of Louisville, Ky. The invention consists in wings eccentrically pivoted to arms attached to the dasher handle.

A cultivator that is constructed so that its teeth may be elevated or depressed at will, so that it may be hauled or drawn over the road on its own wheels, has been patented by Mr. Wm. Jones, of Mill Point, N. Y. It will cultivate or make a furrow close to a fence or hedge.

An improved machine for stacking and ricking hay and straw has been patented by Mr. B. E. Jones, of Boonville, Mo. The invention consists in a combination of devices which cannot be readily described without an engraving.

Mr. A. W. Meyer, of Labadie, Mo., has devised an improved straw elevator for thrashers and separators, which consists in the combination of a fan blower, a pivoted screen held in a horizontal position by a weighted arm, and a conductor spout, with a stacker having cross slots in its floor.

An improved sulky scraper, constructed so that it may be readily adjusted to the various positions required for collecting, carrying, and dumping the load by the driver from his seat, has been patented by Mr. William C. Marr, of Onawa, La.

Mr. James M. Matthews, of Knoxville, Tenn., has patented an improved plow, which has a semicircular iron beam upon which the mould board is made adjustable.

Mr. Sam. T. Ferguson, of Minneapolis, Minn., has patented an improvement in horse rakes, which consists in a yielding or flexible lever, which may be held by the hand of the driver, and which may be readily changed to

a rigid lock lever which will hold the teeth of the rake to the ground without the aid of the driver.

The Fur on the Tongue.

The nature of the fur on the tongue has been the subject of a study by Henry T. Butlin, F.R.C.S., and the results of his investigation are given in a paper read at a recent meeting of the Royal Society. The author finds that tongue fur consists chiefly of (1) debris of food and bubbles of mucus and saliva, (2) epithelium, (3) masses which at first appear to consist of granular matter, but which are the glæa of certain forms of schistomycetous fungi. In order to ascertain the true nature of the glæa, and to obtain it in a purer form, it was cultivated upon a warm stage. Several fungi were discovered, but only two of these were present in every instance, *Micrococcus* and *Bacillus subtilis*, and as the glæa produced artificially was similar to that existing naturally in the tongue fur, it is believed the fur is composed essentially of these two fungi.

Micrococcus developed freely and abundantly, forming large masses of yellow or brownish yellow color. *Bacillus* did not develop, but existed in greater or less abundance in all the cases examined. It appeared to be identical with the *Leptothrix buccalis* described by Robin. Although it did not develop under artificial conditions, it is probable that development takes place freely upon the surface of the tongue. Its habitual occurrence there, and the presence of spore-bearing filaments, favor this view. Besides these fungi there were present in more or less abundance, *Bacterium termo*, *Sarcina ventriculi*, *Spirochaeta plicatilis*, and a larger form of *Spirillum* or *Vibrio*. The first of these fungi existed in some of the furs, and twice developed with great rapidity. The second was frequently present, and generally developed quickly, forming large masses of a yellow or yellowish brown color. The *Spirochaeta* occurred in only two or three of the specimens examined.

The slime between and around the teeth was found to consist of the same fungi as the tongue fur, but the rods of *Bacillus* were longer, probably owing to fewer disturbances.