Correspondence.

Prof. Brooks Discovers a New Comet.

To the Editor of the Scientific American:

Early this morning it was my good fortune to discover a fine new telescopic comet, while searching the eastern heavens, which were beautifully clear. The position was R. A. 12 hours 21 minutes, declination north 12° 55', with a slow motion in a northeasterly course. The comet is bright telescopic, with a short tail.

Further particulars will be communicated to your readers as soon as the observations are secured.

WILLIAM R. BROOKS.

Smith Observatory, Geneva, N. Y., Oct. 17, 1893.

How to Preserve the Egyptian Obelisk.

To the Editor of the Scientific American:

I see from a Philadelphia paper that some one in New York proposes that the obelisk in Central Park should be gilded to preserve it from further decay. Gilding will not do any good. Why not copper-plate it with a moderately thick coat of copper? A coating of 6 to 8 ounces of copper per square foot, applied by the electrolytic method, would not obliterate any of the carvings on its face and would preserve it for all time. If the color of the copper should be objectionable, a coat of aluminum could be applied over the copper, which, after some months' exposure, would give it the appearance of stone. There would be no difficulty in applying the copper. The obelisk is already soaked with paraffine, and it only needs to be plumbagoed to be in a condition to receive a deposit, which could be applied in the way that it is intended to electroplate ships' bottoms with copper, viz., by plating it in sections which overlap. The cost would not be high, and it would not require much time to do it.

J. D. DARLING.

Frankford, Philadelphia, September 25, 1893.

Natural History Notes.

The Parasol Ant.—The action taken by the legislature in regard to the destruction of the parasol or leaf-cutting ant in Trinidad has drawn fresh attention to the habits of this insect, and very interesting information has been published respecting it. The most accessible account hitherto existing is that given by Belt in "The Naturalist in Nicaragua." The results of recent investigations have confirmed this author in the supposition that the ants cut up the leaves of plants and bring the pieces into their nest to serve as a pabulum on which to grow a fungus. In fact, these pieces are used to form an underground mushroom bed, and the ants use the conidial stage of the fungus for purposes of food for themselves and their larvæ. The Hon. J. E. Tucker, Director of Public Works, Trinidad, gave some interesting particulars of the habits of the parasol ant in the *Journal* of the Trinidad Field Naturalists' Club for August, 1892. He had two nests on a table in his house. In one nest with a queen the ants readily supplied themselves with pieces of leaves from plants placed near their feeding ground. Each forager dropped his portion of leaf in the nest and it was taken up by a small worker and carried to a clear space to be cleaned. It was then taken in hand by the large workers, which, after licking it with their tongues, reduced it to a small black ball of pulp. These balls were built on the edge of the already formed fungus bed and slightly smoothed down. The new surface was then planted with portions of the fungus brought from the older parts of the nest. "Each piece is planted separately, and the ants know exactly how far apart the plants should be. It sometimes looks as if the bits of fungus had been put in too scantily in places, yet in about forty hours (if the humidity has been properly regulated) it is all evenly covered with a mantle as if of very fine snow."

In an exhaustive memoir on the "Mushroom Gardens of Some South American Ants," recently published by Alfred Moller, who studied the subject on the spot, the statement made by Belt respecting the cutting up of leaves by ants for the formation of a pabulum on which a fungus is grown that serves as food has been corroborated. The method of leaf cutting, the various species of plants used, and the formation of the "mushroom gardens" are given in detail; but the most interesting and hitherto unknown portion is that relating to the fungus cultivated by the ants in their "mushroom gardens." A series of cultures has proved this to be the mycelium and conidial stage of a fine agaric, which, according to the Friesian system, would belong to the sub-genus *Pholiota* of *Agaricus*, but which has been called by Moller *Rozites gongylophora.* The agaric grows in dense tufts, and has a purplish, scaly pileus, 10–16 cm. across. The highest form of the fungus does not occur normally in the "mushroom gardens," but only the mycelium and conidial forms, and it is the last named conditions that are eaten by the ants.

Observations were made by Moller on the "mushroom gardens" of ants belonging to the following genera: *Atta* (*Acromyrmex*) Mayr. (*A. discigera*, Mayr.; *A. hystrix*, Latr.; and *A. coronata*, Fabr.); *Apterostigma*, Mayr.; and *Cyphomyrmex*, Mayr.

Although Moller did not directly study the fungus cultivated by the Trinidad species (*Œcodoma cephalotes*) there is now little doubt that it is identical with that described by him as *Rozites gongylophora.*

The Sense of Vision in Ants and Bees.—It is generally assumed not only that the world really exists as we see it, but that it appears to other animals pretty nearly the same as we see it. A little consideration, however, is sufficient to show that this is very far from being certain, or even probable. In the case of insects, moreover, the mode of vision is still an enigma. They have (at least many of them have) a large compound eye on each side, and ocelli, generally three in number, situated on the summit of the head. The compound eyes consist of a number of facets, each situated at the summit of a tube, to the base of which runs a fiber of the optic nerve. The structure of the ocellus and that of the compound eye are different, and it does not seem possible that the ocellus should be derived from the compound eye, or *vice versa.* On the contrary, both seem to point back to a less developed ancestry. Starting from such an origin, an increase of the separate elements and an improvement of the lens would lead to the oculus, while an increase to the number of eyes would bring us to the compound eye. On the other hand, there are reasons for believing the different kinds of eyes to be of distinct origin.

It seems clear that the picture produced by the ocelli must be altogether different from the picture given by the compound eye, and we may reasonably conclude that the two organs have distinct functions. It used formerly to be supposed that the compound eye was for distant vision and the ocelli for near vision. Claparoedr, however, maintains the opposite theory, while Mr. Lowne regards the ocelli as incapable of producing anything worthy of the name of an image, and suspects that their function is the intensity in the direction of light, rather than vision. The ocelli, or simple eye, sees in the same way as ours do, that is to say, the lens throws an image on the back of the eye, which we call the retina. In that case they would see everything really reversed as we do, though long experience has given us the right impression. The simple eye of insects thus resembles ours in this respect. As regards the mode of vision of the compound eyes, there are two distinct theories.

According to one, that is the mosaic theory of Muller, each facet takes in only a small portion of the field, while, according to the other theory, each facet acts as a separate eye. This latter view has been maintained by many high authorities, but it is difficult to understand how so many images could be combined into one picture. Some insects have more than twenty thousand facets on each side of their head. No ants, indeed, have so many; but some there are that have not less than one thousand eye facets. The theory, moreover, presents some anatomical difficulties. Thus in certain cases there is no lens, and consequently there can be no image. In some it would seem that the image would be formed completely behind the eye, while in others, again, it would be in front of the receptive surface. Another difficulty is that any true projection of an image would in certain species be precluded by the presence of impenetrable pigment, which only leaves a minute central image passage for the light rays. Again, it is urged that even the sharpest image would be useless, from the absence of a suitable receptive surface, since the structure of the receptive surface, belonging to each facet, seems to preclude it from receiving more than a single impression. The prevailing opinion among entomologists now is that each facet receives the impression of one pencil of rays, so that in fact the image formed in a compound eye is a kind of mosaic. On the other hand, this theory itself presents many difficulties. Those ants which have few facets must have an externally imperfect vision. Again, while the image produced in the retina of the ocellus must, of course, be reversed, as in human eyes, in the compound eye, on the contrary, the vision on this theory would be direct. That the same animal should see some things directly and others reversed, and yet obtain definite conceptions of the outer world, would be very remarkable. But while it is difficult to perceive how ants see, yet they do see.—*Science Gossip.*

A Fighting Stratagem of the Crawfish.—The common crawfish (*Palinurus vulgaris*) has many points of interest, and not the least curious is his plan of combat when matched wth a powerful antagonist. Without chelate limbs, he seems weak and defenseless. One is at first inclined to commiserate this apparent want of means alike of offense or defense, especially in comparison with his kindred, the lobsters, armed so well with powerful seizing chelæ. That he had means of defense seemed probable; but it is only within the last few days that this was satisfactorily demonstrated. Without any particular intention in view, we had dropped a medium sized lobster into the tank containing two large *Palinurus.* At first no sign was given, but in a little while we were attracted by a loud noise as of a skirmish, and had an inimitable object lesson in crawfish warfare. The larger of the two crawfish apparently resented the intrusion of the lobster, and was determined upon ejection. There was a good deal of preliminary sparring, but the fight, which promised to be protracted, ended suddenly in a most unexpected manner. Making a sudden twist, the crawfish got above the lobster crosswise, and suddenly snapping his powerful tail, jammed the body of his antagonist in the fold, thus impaling him on the sharp downward spikes of the pleura that are so conspicuous objects in a side view of *Palinurus.* The lobster was put quite *hors de combat*, for his body was terribly mutilated by the sharp spines, which had pierced his armor as though it were tissue paper. Besides this instance, cases are known where persons incautiously handling the crawfish have received wounds on the arm inflicted by a similar sudden flap of the tail.—*Jas. Hornell, in Natural Science.*

Habits of the Secretary Bird.—As soon as the secretary bird, or snake eater (*Gypogeranus serpentarius*), of South Africa, discovers a snake, it advances toward it, without hurry and without hesitation, and when withing striking distance it immediately elevates its crest and the feathers of the neck, and, without losing any time, delivers a blow with its foot. If the snake has avoided the blow and attempts to strike in return, the bird interposes a wing, thus receiving the deadly fangs harmlessly upon the long feathers, and immediately strikes again.

The fight is then virtually over, for if the secretary gets in a single blow the snake's back is broken, and the bird, like lightning, plants its foot firmly on the reptile's neck and head, pressing them into the ground, while it delivers the *coup de grace* with its beak, and then deliberately swallows the snake whole, beginning at the tail, and, just before the head disappears, giving it a parting rap on the ground.

But there is nothing refined about the secretary bird's appetite, for one writer says he found inside one three serpents "as long as his arm," eleven lizards seven inches long, twenty-one tortoises about two inches in diameter, "besides a large quantity of grasshoppers and other insects;" or, in other words, seven and a half feet of snake, six and a half of lizard, three and a half of tortoise, and, say, a yard of miscellaneous trifles!

The secretary bird is protected by the Cape authorities for the immense public benefit it confers in eating poisonous snakes, and a penalty is attached by law to its destruction. And, if it were necessary, hundreds of eyewitnesses could be called to prove its right to the title of "Serpentarius." Curiously enough, too, this bird can be trained, and is trained, to protect poultry yards, not only from snakes, which are all too fond of eggs, but from other birds of prey.—*St. James's Budget.*

The Perfume of Flowers.—The following conclusions are the result of the researches of Mr. E. Mesnard upon the mode of production of the perfume in flowers:

1. The essential oil is generally found localized in the epidermic cells of the upper surface of the petals or sepals. It may exist upon both surfaces, especially if the floral parts are completely concealed in the bud. The lower surface generally contains tannin or pigments derived therefrom.

2. The chlorophyl seems in all cases to give rise to the essential oil.

3. The disengagement of the perfume of the flower makes itself perceptible only when the essential oil is sufficiently disengaged from the intermediate products that have given rise to it, and is found, in a manner, in a ratio inverse to the production of tannin and pigments in the flower.

This, says Mr. Mesnard, will explain (*a*) why flowers with green petals have no odor, (*b*) why white or rose-colored flowers are most often odoriferous, (*c*) why the compositæ, which are rich in tannin, have the disagreeable odor that they are known to possess, and (*d*) why the white lilac and forced roses take on a finer perfume.

A Carnivorous Caterpillar.—Prof. Perrier, of the Paris Museum, recently stated to the Academy of Sciences that Mr. Rouzand, *maitre de conferences* at the Faculty of Sciences of Montpellier, has studied the habits and metamorphoses of a remarkable butterfly whose caterpillar lives upon the olive tree. This lepidopter was briefly described by Rambour sixty years ago, under the name of *Erastria scicula.*

Unlike its fellows, the caterpillar of the *Erastria* does not eat the leaves of the tree upon which it lives, but, on the contrary, despoils the latter of its parasites. It is not herbivorous, but carnivorous, and feeds upon the coccinellidæ that abound upon the olive tree and often cause the death of it.

In addition to this peculiarity, this singular animal presents others of great interest. In its adult state it is so colored as to exactly simulate the excrement of the sparrow. While very young it hides itself under the carapace of the coccinellidæ that it devours. When a little older it spins a ring of silk around such carapace, and thus enlarges its dwelling in such a way that it shall always be adapted to its own size. Let us add that it conceals this addition under the debris of coccinellidæ and the spores of *Fumago,* a fungus parasite of the olive tree.