Correspondence.

The Hut-building Cicada.

To the Editor of the SCIENTIFIC AMERICAN.

I was much interested in the article which you published in your issue of October 13 on the "Hut-building of the Seventeen Year Cicada," by Mr. Lander. I think he is on the right track to a solution of the problem by agitating the matter, but I can hardly agree with him in his explanation.

According to my experience, he is quite right in not regarding the seventeen year cicada as a migrating insect; but it seems to me that the lack of this trait will not and, in fact, has not prevented it from spreading over a large extent of country. It must have had some means, or may be many means, of being transported from one place to another. Whether the transportation is intended or purely accidental I cannot say. It seems to me that there are many ways that the insect can be spread over the country, the extent of the dispersion depending only on time. In support of this view I will state the following instance:

On Decoration Day I took a long drive about the country in which my home is situated. I drove about 30 miles through all sorts of country; in some places the seventeen year cicada was plentiful, in others scarce, and in many places was not to be seen at all. During the course of the drive I stopped on top of the Watchung Hills, at a point about 400 feet above the sea level and perfectly dry; that is, it was not swamp land. As I was putting blankets on the horses I noticed a seventeen year cicada on the back of one of them. I picked it off and observed that it was a female and then let it go. I thought nothing more about it until I read Mr. Lander's article, then the thought came to me that if that female had been a hut-builder from some lowland, then, according to Prof. Riley's theory, there would be mud huts on top of that hill for the next few generations anyway. How long it would take the trait to die out I am not able to say.

We have stories of their getting on railroad trains. In this way they could be carried quite a distance before the train would be clear of them. So it seems to me that the hut-builders could very easily be carried from low to high land in one way or another.

I do not think it possible for the earth to become in a few weeks so warm from the solar heat rays that any creature living in the earth would be forced to come to the surface; which action I think would only make the matter worse, by reason of its getting into much warmer strata. In the case of the hut-building pupæ, it seems to me that they could do nothing worse than to build such a hut. It would be out of the frying pan and into the fire, as the old saying goes. Dr. Southwick gave me some huts which he collected at New Baltimore, N. Y., they were hard and dry, having the appearance of sun dried clay. Surely the pupa would find it much warmer in such a position than it would below the surface.

The hut receives the heat rays on all sides. It would also receive a great deal of heat by radiation from surrounding ground.

I offer as an explanation of this matter, that the pupæ build these huts to receive heat instead of avoiding it, and that this habit has been developed by those who happened to emerge in wet places where the earth could not become as warm as in dry places.

That these hut-building insects have been in various ways transported to high ground, and have not yet lost the hut-building trait—this I believe is practically Prof. Riley's explanation of the matter.

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Plainfield, N. J., October 24, 1894.

Homemade Beef Powder.

Dr. William R. Huggard (Davos Platz, Switzerland) writes in the British Medical Journal of June 9, 1894: Some of the beef powders in the market smell and taste of the chemist's shop, and are not readily taken by an invalid whose palate requires to be coaxed. A happy idea struck the writer several months ago that beef powder might without difficulty be prepared fresh and on a small scale by any ordinary cook. The experiment was made, and the result was satisfactory beyond expectation. Beef powder made at home is appetizing, has a delicate aroma and flavor, and can be taken with pleasure by invalids who turn with aversion from ordinary food. If a little pepsin be taken at the same time, it is digested even when the ordinary peptonized foods are not retained. The mode of preparation is simple. Lean beef is cut into small pieces; these are put into boiling fat, dripping, or butter for a couple of minutes until the surface is browned. They are then removed from the fat and placed on a strainer for a few moments. Afterward they are placed in a mincing machine. The resulting mince is placed in a slow oven and dried. The drying process may take from five to twenty-four hours, or even longer, according to the heat employed. When thoroughly dried, the meat is quite crisp, and can be ground in a coffee mill that has not been used for any other purpose. In the drying process the meat loses a trifle more than four-fifths of its weight. This beef powder can be taken in various ways—with hot water or soup, with mashed potatoes, with bread and butter in a sandwich, or with a little pepsin in a starch wafer. The writer has given this homemade beef powder with such excellent effect in several cases where there was much difficulty with food that he thinks others may find it useful.

Beef powder, carefully prepared according to the directions above given, has an agreeable flavor, and admits of being used like potted meat by persons of delicate or fanciful appetite. By regulating the heat applied in making the powder, the albuminous constituents need not be coagulated, but merely dried, and the digestibility of the powder would then be increased; in any case, the finely divided condition would facilitate digestion. A very good beef tea may be made from the powder by infusing it in moderately hot water. For the preservation of the powder it would be necessary to keep it from contact with atmospheric air and to avoid the access of mites or similar deteriorating influences.

Natural History Notes.

Fountain Trees.—Mr. Duchartre recently made known to the French Academy of Sciences the results of an experiment made by Mr. Maxime Lecompte in Congo upon a tree of the genus Musenga. Upon making incisions in the trunk of it and placing a pail at the foot of the tree more than ten quarts of pure water were collected in thirteen hours. The gorillas, it seems, are in the habit of slaking their thirst at these hidden fountains, and regulate the flow of the liquid at will by pulling off different sized branches.

Many years ago, Dr. Wallich found in the province of Martaban, Africa, a plant belonging to the same natural order, whose soft and porous wood discharged, when wounded, a very large quantity of a pure and tasteless fluid, which was quite wholesome and was used as a beverage by the natives. This plant was named by Dr. Wallich the water vine, and has been placed in the genus Phytocrene, which signifies "plant fountain."

These plants form a remarkable exception to the usual character of the order, which embraces species that produce a milky juice, such, for example, as the celebrated cow tree, or Palo de Vaca of South America, which yields a copious supply of a rich and wholesome milk, as good as that of the cow, and used for the same purposes.

The Exploits of Diving Birds.—Engineers have often announced that submarine vessels would some day acquire a speed much greater than that of ordinary ships. The diving birds furnish us with a powerful argument in support of this opinion, for they move with surprising rapidity under water. The penguin, for example, can neither fly nor walk, but hops along as if its legs were tied together. Nor does it swim, for it literally flies under water. When, at the Zoological Garden of London, the keeper brings food to these birds, a sudden transformation is witnessed. The bird, which is heavy and awkward, suddenly becomes a superb and rapid creature, covered with globules of silver formed by the air imprisoned in its plumage, and flying in the depths of the placid water with a rapidity of evolution that is unknown in aerial flight. The motion of its wings is identical with that of ordinary flight, and its feet, extended in a line with its body, serve neither as motors nor as rudders. Steering is effected through the acceleration of the motion of one of the wings at the expense of the other. The fish thus chased is captured and swallowed without any retardation of the speed of the bird being visible. The cormorant, on the contrary, swims with his feet, which act like the paddle boards of the wheel of a steamboat. Yet the conditions of the submarine medium are so exceptionally favorable that the speed obtained therein by the cormorant is three or four times greater than that which it makes upon the surface.

Intercellular Communication in Lichens.—Mr. G. Poirault has found in the thallus and apothecia of lichens indications of very minute channels in the cell walls, permitting of the intercommunication of the cell contents, the protoplasm communicating through the perforations in the membrane. Fresh material is not necessary for the examination, and previous fixation of the protoplasm is not required, as in the case of the phanerogams. In Usnea barbata communication is said to exist between distant elements, as well as between adjoining cells. Other species in which similar phenomena have been observed are Cladonia rangiferina, Peltigera canina, and Calicium chrysocephalum. It is proposed to illustrate these peculiarities of structure in a subsequent note.

Classification of Plant Tissues.—Recent attempts to found an internal morphology of plants have given a new life to the study of botany.

The recent progress in this direction is mainly due to Van Tieghem, the French botanist, the characteristic feature of whose anatomical teaching is the recognition of the central cylinder or "stele," as a definite region comparable to cortex and epidermis. In the root the central cylinder is perfectly well defined, including within it the ring of alternating bundles of wood and bast, accompanied by a certain amount of parenchyma (conjunctive tissue), the outer layer of which constitutes the pericycle, or limiting layer of the stele. The cortex, the inner layer of which is the endodermis, surrounds the stele, and outside the cortex is the piliferous layer or epidermis.

The same three regions—central cylinder, cortex, and epidermis—exist in the stem. The stele is made up of the vascular bundles and conjunctive tissue, the latter constituting the pith, primary medullary rays, and pericycle. The last named is often less obvious than in the root, but is characterized by the same power of forming new tissues and organs. At every node the continuity of the main stele is interrupted, and its limits may be difficult to recognize, but it is none the less a distinct region in the stem because it possesses prolongations into the leaves. Where the vascular bundles bend out from the stem into the leaf, they are accompanied by conjunctive tissue, and the name "meristele" is applied by Van Tieghem to such a bundle or group of bundles entering a leaf, with their enveloping conjunctive tissue. Thus the stele tissue of the whole plant is seen to be continuous through all its organs—root, stem, and leaf.

In the typical stems of phanerogams there is a single central cylinder in direct continuation with that of the main root. This "monostelic" condition is constant in the embryonic stem of all vascular plants. But in many vascular cryptogams and in the genera Gunnera and Primula, section Auricula, the cylinder divides up above the hypocotyl or first stage of the stem, a number of equivalent steles thus resulting. In most ferns, and in many selaginellas, this "polystely" occurs.

"Astely," or "schizostely," is a departure from typical structure characterized by the stele completely breaking up into the individual bundles, each surrounded by its own "peridesm" (the conjunctive tissue at the periphery of any portion of a subdivided stele, as distinguished from the pericycle which surrounds an entire stele) and endodermis. Typical examples occur in Equisetum limosum and other species, in Nymphæa and aquatic species of Ranunculus, etc.

Change of Color in the Hare.—From a study of seventy-five specimens of the northern hare or white rabbit (Lepus americanus, Erxl.), collected for the purpose of investigating the spring and autumn change of color, Mr. J. A. Allen reaches the following conclusions:

1. The change of color, both in autumn and in the spring, is due to change of pelage, and not to a change in the hair itself.

2. The change is gradual, occupying many weeks.

3. The method of change, as regards the parts first affected, is the reverse in spring in the order characterizing the autumnal change.

4. In the early part of spring, after the white overhair has been shed, the pelage consists of the heavy coat of soft winter underfur. This gradually disappears as the summer coat thickens.

5. In spring the moult occurs quite as early and proceeds just as rapidly in the females as in the males, and the moult is practically completed before the young are born.

These conclusions differ widely from views hitherto entertained by both scientific and non scientific writers.

Foothold on Pavements.

Some little time ago officers of metropolitan police were deputed to make certain observations concerning road traffic generally during the discharge of their daily duty in the busiest thoroughfares. These observations extended over fifty days of twelve hours each day, namely, from 8 A. M. to 8 P. M., and granite, asphalt, and wood pavement were considered. In one day of twelve hours no fewer than 12,366 horses and vehicles passed along Cheapside, and 5,350 along Cannon Street. During the fifty days upon which observations were taken, 542 accidents took place on wood pavement, 719 on granite, and 1,066 on asphalt. From these figures it was estimated by an expert that a horse could travel 330 miles on wood pavement during the fifty days without meeting with an accident, 191 on granite, and 132 on asphalt; therefore the great superiority of wood pavement over all others—at least, where horses are concerned—is at once apparent. Altogether, 1,054 falls were recorded, and an analysis of this number (London says) affords some curious information. On asphalt, 247 partial and 190 complete falls took place; on wood 326—only 39 complete falls. Roughly, for every fall on wood pavement four took place on granite and asphalt.

An Atom of Electricity.

According to a recent determination of Professor Richarz, the smallest possible quantity of electricity, which may be termed an atom of electricity, is such that 430 multiplied by a million three times, that is, by the cube of a million, will give the number of these atoms contained in a coulomb. That such a thing as an atom of electricity exists is the opinion of no less an authority than Professor Von Helmholtz.