Correspondence.

The Gray Cat and the Yellow Hen.

To the Editor of the Scientific American:

Occasionally we see newspaper accounts of unusual cases of friendship existing between animals. One of these friendships has recently come under my observation, and I send you a short account of it, since such things are of some scientific interest.

This friendship is between a gray cat and a yellow hen, at the home of the Widow Eads, near Gap Mills, Monroe Co., W. Va. Mrs. Eads is now nearly ninety-five, was born a year before the death of Washington, and says that this friendship between the cat and the hen is the only one of the unusual kind she has ever seen.

The friendship probably sprang up some time during the past severe winter. At any rate, it was first noticed at that time, and since the cat was never allowed to stay in the house, one might suppose it started as a matter of mutual defense against the cold.

They are often seen in the yard together, the cat walking quietly and contentedly beside the beloved yellow hen. From time to time the cat, being of an affectionate disposition, desires fondling, and stops the hen from picking in the grass, and rubs herself several times back and forth on the chicken's breast, all the time with her eyes half shut and softly purring.

The cat is a little shy, and I could not coax her to come to me, but I soon succeeded in getting the hen to feed from my hand.

At the risk of making this appear still more incredible, I will add the further fact that the hen has one normal eye, rather dark, with large pupil, while the other is quite light and has an exceedingly small pupil. Some experiments lead me to believe vision to be imperfect in the light eye. W. J. HUMPHREYS,

Professor of Physics.

The Miller Manual Labor School of Albemarle,
Crozet, Va., July 21, 1893.

Water Power Electricity at Tampa.

To the Editor of the Scientific American:

The industrial utilization of water power is well illustrated here in Tampa, by the completion of the dam across the Hillsborough river, six miles above this place. This dam gives a 14 foot head of water, which is used to propel six Leffel turbine wheels, varying from 175 to 250 horse power each. They can develop about 1,100 horse power.

Only two or three of the turbines are now being used. One is running a Thomson-Houston generator, which is supplying a 2,000 volt lighting circuit on which they use Thomson-Houston transformers, from 2,000 to 50 volts.

A second is used on a Thomson-Houston generator which supplies a 500 volt street railway and power circuit. These turbines are governed by Woodward's automatic governors. The company is known as the Consumers' Electric Light and Street Railway Company.

They have about five miles of track laid in the city, and are operating four motor cars and one double-decker.

They have four trailers, which can be attached to the motors when desired.

The current runs from the power house to Tampa, a distance of six miles.

Bare copper wires are used to conduct the current this distance.

We have a small fan motor propelled by this current, and on suspending a needle beneath the wire I discover that the current comes in on the ground wire and goes out on the trolley.

They have received two strokes of lightning, burning out an armature each time.

They are building their track to Port Tampa City, nine miles southwest; then the track is to run six miles northeast of here to the power house, making a fifteen mile air line.

The water power is almost inexhaustible, and has backed up the river fourteen miles.

The company have about 900 acres of excellent cypress timber, which this back water enables them to float down to their mill site, which is situated opposite the power house across the river.

This mill will receive its power from the turbines through a traction cable.

It is generally understood that Mrs. Chapin (the wife of the millionaire) is the largest shareholder.

Tampa, Fla., July 20, 1893. H. BOMFORD.

Notable Aurora.

To the Editor of the Scientific American:

On the evening of July 15 there appeared at Elkhart, Ind., a most wonderful and extraordinary exhibition of northern lights. It began shortly after sundown and lasted until past midnight. The northern sky to a distance of fifteen degrees above the horizon was occupied by a massive white haze or glow, apparently in a quiescent state. Very few upward shooting beams of light were observable, and these only in the beginning of the display. Between 9:30 and 10:30 o'clock appeared a wholly novel and striking phenomenon. Three-fourths of the distance to the zenith, in the northeast sky, would suddenly spring into being long beams of white light that, as soon as organized, would begin a lateral motion toward the northwest, moving over an arc of sixty degrees in ten seconds. These beams followed one another at regular and brief intervals, so that there would be twenty or more in sight and in motion at once. During their swift lateral motion they preserved their integrity and a uniform, undiminished brightness. There was a perfectly clear and starlit interval between these moving beams, and the white mass resting on the horizon, of several degrees.

When the beams in motion reached a point in the northwest sky they appeared to encounter some obstacle to their further progress, and would there successively merge into one another and constitute a continuous body of light, reaching to the horizon. The moving beams lasted with great constancy for twenty-five minutes, the rate of motion at no time varying. They suddenly ceased, and the sky over which they had traveled thereafter remained clear. At the point in the northwest sky where the lateral motion had terminated, the light now became condensed in one broad or sometimes two sheets of light of great brilliancy, that shone for several minutes continuously, with but little change of form. These sheets of light were much longer than the traveling beams had been, but were not sufficiently extended below to make connection with the white mass on the horizon. They lasted in great beauty for twenty minutes. When they suddenly vanished, the horizon light for the first time appeared to become active, increased greatly in brilliancy, and rose *en masse* above the horizon, from which it was soon disconnected and showed a lower edge constituting the arc of a circle that was strongly serrated, like the crest of an inverted mountain range. This, with slight variations, terminated the display. I have made a particular study of auroras for the last forty years, but I have never before seen or heard of any in which this spectacle of lateral motion occurred.

Elkhart, Indiana. C. H. MURRAY.

[The lateral motion of the auroral streamers has been observed during strong displays on several occasions in the Eastern States, always ranging parallel with the magnetic meridian, and may be due to electric translation across the lines of magnetic polarity.—EDITOR.]

Notes on Eggs.

BY P. L. SIMMONDS, F.L.S.

The majority of the vertebrata are oviparous animals producing perfect eggs, which contain all the material necessary for the development of the embryo. Of the five classes, the first four are oviparous, namely, Pisces, Batrachia, Reptilia, and Aves.

The eggs of fishes is too wide a subject to enter upon, but they are much utilized even as food for the human race, in cod and other roes, and in caviare.

Professor Peters has lately described the mode of deposit of its eggs by a tree frog (*Polypedates*) from tropical Western Africa. This species deposits its eggs, as is usual among Batrachians, in a mass of albuminous jelly; but instead of placing this in the water, it attaches it to the leaves of trees which border the shore and overhang a water-hole or pond. Here the albumen speedily dries, forming a horny or glazed coating of the leaf, inclosing the unimpregnated eggs in a strong envelope. Upon the advent of the rainy season, the albumen is softened, and with the eggs is washed into the pool below, now filled with water. Here the male frog finds the masses, and occupies himself with their impregnation.

Frogs and toads lay numbers of small eggs. They are dropped in the water like fish spawn, in long clusters or strings. The Surinam toad (*Pipa*) carries her eggs soldered together like a honeycomb on her back. The *Aliphes* carries them between its legs, rolled up in a bunch.

Among reptiles the eggs exhibit great variety. The eggs of alligators are elongated and almost cylindrical, evenly rounded at both ends, and about the size of an ordinary duck's egg. The eggs of the sea turtle are as large as a small apple, rounded, and have a flexible shell. Those of the snapping turtle (*Chelydra serpentina*) are much smaller, but also rounded. Those of the terrapins (*Clemmys*, and other genera) are oblong, as also are those of lizards. In the common black and yellow dotted American fresh water terrapins, and in the painted terrapin, the eggs require four years of growth before they are laid. Take a seven-year-old turtle of this kind; it will contain only very small eggs, all of uniform size. An eight-year-old tortoise of the same kind will have two sets of eggs, one larger and one smaller. One of nine years will have three sets, the oldest set being the size of a small pea. A tortoise of ten years will have four sets of eggs, and in that year she will lay for the first time, and give birth to the most mature set.

The scaly reptiles—that is, turtles, lizards, and serpents—bring forth eggs similar to those of birds. They arise in the ovary in a similar way, and produce by successive growth yolks of a similar bulk, as do the birds. While, however, all these eggs are surrounded with a shell after fecundation, the egg is not necessarily laid, as in birds, in order to bring forth the new being. The bird brings forth its young by incubation, sitting upon the eggs, and transmitting to them by its own warmth the temperature needed for their final development. For the egg of the reptile, that temperature is usually derived from surrounding conditions. It is true that a few kinds of reptiles, the python for instance, sit upon their eggs and transmit to them a higher temperature from their body; but this is not usually the case.

The eggs of the Australian lace lizard (*Hydrosaurus varius*) are large, covered with a tough, leathery membrane. They deposit some ten or fifteen. The carpet snake of Australia (*Morelia variegata*) produces a large number of eggs, from twenty to thirty. The diamond snake (*Morelia spilotes*) deposits thirty or more eggs. The ringed snake (*Natrix torquata*, Ray) produces fifteen or twenty eggs, which are covered with membrane resembling parchment, and they are agglutinated together in a chain-like necklace. Snakes' eggs are oblong and sometimes cylindrical in shape.

Brown, in his work on Guiana, speaking of the iguana, says: "One of these reptiles, captured at its burrow, when killed and cut up for cooking, was found to contain ten eggs, of an elliptical form, shell-less, and midway in size between a pigeon and a hen's egg. These are good eating, when boiled for about five minutes, and then allowed to get quite cold. They then require some manipulation. A hole is made in one end of the skin and the albuminous part, which never coagulates, is squeezed out. Then the skin is stripped off, and the semi-hardened yolk, of the consistency of butter, is eaten with salt."

In the Mollusca we find a great variety in form among the eggs. They are sometimes, as in the land snails, laid separately, each inclosed in a shell of variable consistence; but in most cases they are agglutinated together in a mass, which sometimes takes the form of a ribbon, attached by one of its edges to some submarine body. Those of the *Bulimus* might be taken for a humming-bird's egg. The eggs of the great *Achatina* exceed an inch in length, and have a calcareous shell. The tropical *Bulimi* cement leaves together, to protect and conceal their large, bird-like eggs. The slugs bury theirs in the ground; the oceanic snail (*Janthina*) attaches them to a floating raft, and the *Argonaut* carries them in her frail boat. In some marine species the eggs are inclosed in leathery capsules, which are often united in a large mass. Each capsule contains numerous eggs. The horny capsules of the whelk are clustered in groups, with spaces pervading the interior, for the passage of sea water. The nidamental ribbon of the *Doris* and *Eolis* is attached to a rock, or some solid surface, from which it will not be detached by the waves.

The periwinkle lays an immense mass of eggs, larger than its own shell. In bivalves the eggs are usually like spawn, and generally retained by the mother. The ovaries of the brunnion, a snail without shell, are eaten in Nice.

The eggs of the octopus, we are told, when first laid are small, oval, translucent granules, resembling little grains of rice, and not quite an eighth of an inch in length. They are attached to a common stalk, to which every egg is separately attached, as grapes form part of a bunch. Each of these clusters contains about one thousand eggs, and a large octopus will produce forty thousand to fifty thousand.

The *Pyrula* lays a long string of egg cases, each containing from fifteen to twenty eggs, or sometimes more.

The eggs of the king crabs (*Limulus gigas* and *L. moluccanus*), which are collected in large quantities, among other places on the north coast of Java, are considered a delicacy by the natives and are eaten both fresh and salted, as the spawn of the lobster is here.—*Science Gossip.*

Growth of Willow Trees.

Garden and Forest has received a photograph of a willow tree standing in Waterbury Center, Vt., the trunk of which measures twenty-four and a half feet in circumference, and whose symmetrical top shades an eighth of an acre of ground. A person who knows the early history of the willow testifies that in 1840 it was a tree about six inches in diameter, which had grown from a walking-stick driven into the ground a few years before by some children. In that year it was cut down deep into the ground in the hope of killing it, but it started a new growth, and has reached its present dimensions in fifty years. The rapid growth of the willow in favorable localities is well known, and Dr. Hoskins (from whom the photograph was received) writes of another near his home, which sprang from a cane carried by a returning soldier in 1866, and thrust into the soil in his dooryard. It is now more than four feet in diameter with an immense top, and bids fair, at an equal age, to reach the dimensions of the one spoken of.