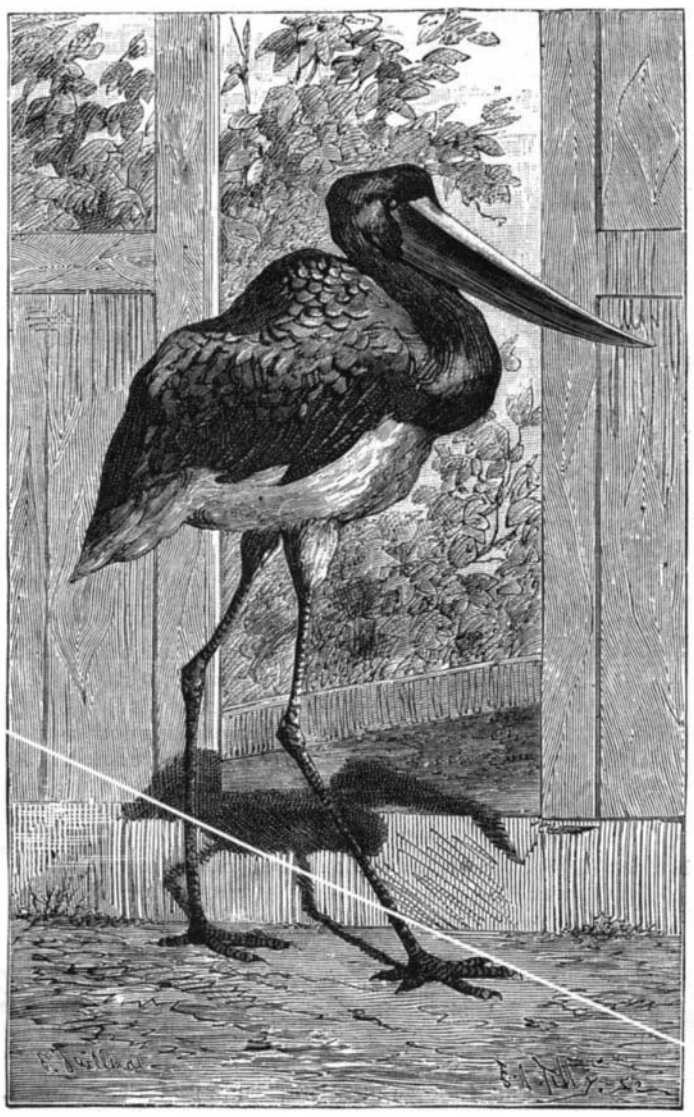
THE JABIRU OF SENEGAL.

The Jardin des Plantes, at Paris, has been enriched recently by the acquisition of various animals. One of the most interesting of these, without doubt, is the jabiru of Senegal, which naturalists, in their not very harmonious language, call the *Mycteria senegalensis*. This bird belongs to a genus allied to the one containing the marabou, which is so well known to those who frequent zoological gardens, and to the same family as our storks. It is impossible in examining it not to make the reflection that animals possess a physiognomy in keeping with their habits. The marabou, a bird of revolting voraciousness, which shares with the vulture the duty of disposing of carcasses and various kinds of filth lying around, is fully as repulsive in its aspect as the jabiru is attractive. It is, in fact, because the latter eats living prey and has the bold and free step of the hunter. Living in the vicinity of ponds and rivers, it hunts and fishes by turns. It often flies, which is something that the marabou rarely does, as the latter is kept on the ground by its duty as a scavenger. The jabiru lives in pairs, and the male and female of each couple never leave one another. Its area of distribution is quite an extended one. From the banks of the White Nile, as far as Senegal, having for northern limit the fourteenth degree of latitude, it lives in the whole center and southwest of Africa, although nowhere abundant.

It is larger than our stork, and its back, the upper part of its wings, its head, neck, and tail are of a brilliant black, while the lower parts of its body are of a beautiful white. Its red and black bill is provided with two pendent wattles that have been likened to a saddle, and that have sometimes given the bird the name of the saddled stork. In captivity it is a pleasant companion. It respects its neighbors, but wishes to be respected by them. Like the stork, it has great regard for its dignity and does not allow any one to injure it. According to Bennett, who has made observations on Australian jabirus in captivity, the habits of which are much like those of the Senegal bird, and according to Dr. Bodinus, who has had several of the latter in his possession, they are easy to rear and do not suffer from changes in temperature. It would perhaps be possible, then, to acclimate them in our country, where they might, while proving an ornament to our marshes, render service by destroying frogs, field mice, and other vermin. They would swallow here and there a few fish; but, since Europe will soon witness the death of the last heron, it would prove a certain compensation for the friends of animals if they could replace that by a bird of more sociable habits, and which by that very fact would be more effectually protected. The new boarder at the Jardin des Plantes, to judge from the pale tints of its plumage, is still a young bird. It does not appear to us to enjoy very vigorous health. We have seen it often, and it was always seated and making a plaintive clucking, and partially opening with a sickly air its long bill, whose upper mandible had been mended with a piece of tin.—*La Nature.*



THE JABIRU OF SENEGAL.

THE DART SNAKE, OR MILK SNAKE.

This truly pretty serpent is known by several names in different parts of the country. Thus, in the Eastern States it is generally called the "checkered adder," in the Middle States "milk snake," and in Maryland and Virginia "house snake." The name adder came originally from the Anglo-Saxon word *aetter* (poison), and is now generally applied to a venomous species, which our serpent is not. It is called "milk snake," I have been informed, for the reason that it frequents milk houses and drinks milk from the pans; yet I have been told by farmers living in districts, where I knew these serpents to be numerous, that they were *never* found in their milk houses. It has occasionally been seen in cellars and outhouses, but so also have been garter snakes, black, brown, and other snakes. Consequently all of its common names are calculated to mislead in regard to its habits. I have taken the liberty to call it dart snake, which I merely take from its generic name, *Ophibolus*. Whether this name was given on account of the arrow, javelin, or spear-head mark on its head, or from its activity or flashy appearance, I am not certain, but in either case the name is quite applicable.

DART OR MILK SNAKE.—(*Ophibolus doliatus* (Linn.) *triangulus* (Boie).

As regular steps of variation have been observed, from the red snake, *Ophibolus doliatus* (Linn.), to our dart snake, its scientific name should be *Ophibolus doliatus* (Linn.) *triangulus* (Boie), Cope. Dr. De Kay, in the "New York Fauna," named it *Coluber eximius*, not knowing that it had previously been described by Boie as *Coluber triangulum*.

The dart snake is found from Virginia to Canada, and west to Wisconsin. It measures in length from 25 inches to 3 feet 5 inches. The ground color of the body is pale gray or ash, with from forty to fifty transversely elliptical dark-brown dorsal blotches, bordered with black, and one or two rows of small spots along the sides; beneath, white, checkered with dark-brown or black spots.

Unlike our common garter and water snakes, whose young are at the moment of oviposition produced alive, this species is oviparous. The eggs are deposited under a pile of chips or dead leaves, where they are left to hatch. The young, when they first quit the egg, are about four inches in length, and are far prettier than the parent. The spots, which are brown in the adult, are bright red in the baby snakes, and they then greatly resemble the typical red snake, *O. doliatus*.

There is perhaps no snake more useful upon farms than this, for it is a great destroyer of field and meadow mice. I heard of one that was killed which had no less than four field mice in its stomach. I saw a farmer plow up in a short space of time two of these snakes, and in both cases he stopped his horses, pursued, and killed the snakes, and yet by so doing he was throwing away several bushels of grain. I have heard of one instance where one was killed in the act of devouring a young robin; but as the robin is a noted cherry and berry thief, and has a great fondness for the useful earthworm—nature's worker of the soil—he should be classed with the injurious rather than the beneficial birds, and so the snake may be excused this change of its bill of fare. I can accuse this snake of one bad act: A gentleman in New York State found one swallowing a garter snake. The gentleman wrote me that there was no doubt as to what species it was, for it agreed perfectly with a specimen in the museum labeled *Coluber eximius*.

C. FEW SEISS.

The Progress of Cremation.

The president of the New York Cremation Society states that organized cremation societies exist in Italy, at Milan, Udine, Cremona, Como, Rome, Bologna, Pavia, Codogno, Padua, Genoa, Turin, Modena, Florence, Venice, Ancona, Novara, Brescia, Leghorn, Pisa, Placentia, and Parma. The subscribing members of these societies number upward of 5,000. At Lodi optional cremation is made an official sanitary institution by the municipal authorities, and so has outgrown all need of an organized society. There are also corresponding commissions to propagate the principles of cremation at Asti, Mantua, Vicenza, Reggio, and Carpi—in all, twenty-two societies and five propagating commissions.

There are established and in practical operation crematories at Milan (two), Lodi, Cremona, and Varese. There is in process of building a crematory at Rome; and it is reported that crematories are about to be built at Turin, Como, Brescia, and Padua. The actual number of crematories of human bodies at points named have been, down to the end of June, 1882: At Milan, 196; at Lodi, 20; at Cremona, 3—making a total in Italy of 219. At Gotha there have been 69 cases. In this country there have been 20, of which 14 were in the Le Moyne furnace.

The inventors and patentees of crematory apparatus are Gorini, Brunetti, Polli, Clericetti, Terruzzi, Betti, and Venini, of Italy, and Siemens, of Berlin, Dresden, and Gotha.

Gorini furnaces have been set up at Lodi, Milan, Varese, Cremona, Rome, and London, and they are preferred because adapted to any kind of light and inexpensive fuel. Siemens' method, however, has the preference of all scientific experts, as being most rapid and perfect in its work, though a trifle greater in cost than the Gorini method.

The New York Society are confident that a crematory will soon be erected near this city.

Improvement in the Gait of Trotting Horses.

The improvement in the quality of gait of the trotting horse within the last few years is one of the marvels in trotting. Only a very few years ago the jumping-jack kind of trotter was common in the very best localities. Indeed, the skip-jack gait was cultivated, and thought to be indispensable to fast speed in harness. The large majority of trainers argued that the horse must learn to break and catch before he could be relied upon in a race. For, said they, if he is not a good catcher, a break would put him behind the flag. Therefore, the horse must be spoiled before he was good for anything for a harness turf horse. A break rested him, they said. "Give him his head, let him jump a few rods, then set him down, and he can fairly fly." Such were the erroneous teachings of former years.

To-day the gait of the trotter is as smooth and regular as the play of a piston-rod; as rhythmical as the most harmonious symphonies of musical composition. Why is it so? Because fashion dictated. Mr. Bonner bought only such, and gentlemen of wealth everywhere followed his example. As soon as it became known that pure trotting gait was the salable thing trotters began to make rapid improvement in the quality of gait not only, but in quantity as well. The modern trotter is, therefore, a model trotter. This was manifestly true of the horses that participated at Chicago this year, and are now engaged in the various circuits over the country. The change is not due to any particular improvement in the trotting families themselves so much as to the new methods in use for their education. There are few horses on the turf nowadays that pull a ton by the bit as was customary at one time. To trot fast, the horse should not be hampered by any more harness than is necessary for his complete safety. Indeed, we look for the horse to trot best with no more harness than bridle, reins, back-strap, saddle, and girth at an early day.—*Dunton's Spirit of the Turf.*

William Stanley Jevons.

William Stanley Jevons, best known by his masterly work on "The Principles of Science," was drowned while bathing at Bexhill, near Hastings, England, August 15. At the time of his death he was Professor of Political Economy in University College, London.

The Largest Coastwise Cargo.

The cargo taken out by the steamer Chalmette, for New Orleans, August 12, is said to be the largest coastwise cargo ever taken from this port. It comprised 400 car loads of miscellaneous freight for New Orleans and Texas. The Chalmette has a carrying capacity of 9,000 bales of cotton.

The Easily Oxidizable Substances in Plants.

Many expressed vegetable and fruit juices, it is well known, gradually darken when exposed to the air. In other cases, the cut surfaces of roots and branches, of leaves and fleshy fruits, slowly acquire a brownish tone. This interesting property, which is of some importance for an understanding of the chemical properties of the living cells of plants, has been recently more closely examined in his study of the chemistry of protoplasm.

There can be no doubt that this phenomenon is due to an oxidation of certain substances in the sap, or juice, by the oxygen of the air. For, if we grate up some potato tubers, for instance, the upper layer of the magma, which is in contact with the air, takes on a reddish color, and by frequent stirring this red color can be imparted to the entire mass. The juice that is expressed from potatoes has a yellow color, but in the air it rapidly acquires a reddish violet, finally a brown color. In time this color penetrates deeper and deeper, until finally the juice looks like brownish-black ink. By the exclusion of the air, the potato juice can be preserved for a long time colorless. On the other hand, it has been observed that this juice, which had become black if left standing until decay and fermentation began, loses color again, and that this can be accomplished by certain reducing agents like sulphur dioxide and sulphydric acid gases. [In the manufacture of evaporated apples the brown color is removed by burning sulphur before the drying is begun.—TRANS.]

The juice of the sugar beet, the pure white *Beta vulgaris*, is still more sensitive to the oxidizing action of atmospheric oxygen. In contact with air it immediately turns a dirty wine-red, then purple brown, and finally almost black.

These facts show that easily oxidizable substances are present in the living cells of plants, and that they attract atmospheric oxygen with avidity, forming with it oxidation products. Since these products, which are so easily recognized by their dark color, do not occur in the unwounded cells, it follows that there is either no free oxygen within the cells, or that, besides these oxidizable bodies, there are other substances having reducing properties, which prevent the oxidation of the former, or that in protoplasm oxidation produces other substances which are colorless.

[A fourth possibility which Reinke did not consider is that this easily oxidizable substance is produced by rubbing, cutting, or crushing of the cells.]

To decide which of these three supposable cases really exists is not yet possible. It is worthy of notice that a sugar beet cut smoothly across preserves the surface colorless for a long time, while the grated tissues rapidly darken.

The importance, from a physiological view, of the occurrence of an easily oxidizable substance need hardly be mentioned. When engaged in the study of the existence of oxidizing processes in the living cells of plants, one of the first questions that presents itself is, whether there are substances within the cell which at ordinary temperature unite with the oxygen of the air without need of the active assistance of living protoplasm.

To get a nearer view of this oxidizing process, it is, first of all, necessary to isolate that oxidizable substance and learn its chemical composition. For this purpose Reinke made the following successful experiments with the juice of sugar beets and potatoes.

He first proved with certainty, by chemical test, which we need not repeat here, that in the cells of the sugar beet there is a chromogen, soluble in water, but precipitated by acetate of lead, which can be extracted by ether. He named it *rhodogen*, because it oxidizes in the air to a red dyestuff. A direct chemical analysis was impossible because it changed so easily in the air. The properties of the red dye, "beta red," formed by the oxidation of the rhodogen, were examined. The chemical reactions, as well as the physical properties, particularly the absorption spectrum, exhibited so striking a similarity to alkanet red, that the two dyestuffs must stand very near each other chemically. At all events, like groups of atoms must be present which produce the characteristic spectra. The only difference was that the alkanet red changes less readily in the air than beet red.

"This investigation proves that there exists in the colorless cells of the sugar beet an isolatable, very easily oxidizable, colorless body, which of itself, without the aid of living protoplasm, is able to split the oxygen molecule (by reduction if you wish), and to oxidize itself to a colored substance."

The fact already mentioned, that the cut surface of the beet can lie exposed to the air for days and remain colorless, that no "beet-red" is formed in the living cells, seems to point to a noteworthy distinction between living and dead cells. Reinke does not think it probable that the absence of free oxygen in the living cell is the cause of its remaining colorless, nor that the oxidized rhodogen molecule should be immediately reduced again in the living cell. He considers it more probable that in the living protoplasm of the cell rhodogen suffers a much more energetic oxidation than in the air, so that instead of forming a dye, the rhodogen molecule is totally destroyed, forming carbon dioxide and other end products.

The isolation of the chromogen of the potato did not succeed so satisfactorily as with the beets. By a series of reactions a substance was obtained from the juice of the potato, which, of the known aromatic acids, corresponded most nearly with the hydrocaffeic acid. The quantity obtained was too small for a nearer chemical analysis.

The root tubers of the dahlia also yield a juice that becomes colored in the air. Similar treatment of this juice showed that they contain an easily oxidizable substance like potatoes.

Similar oxidizable bodies were discovered in the *Æthalium septicum*, and the juice of the grated roots of *Daucus carota*.

The general results and conclusions are thus summed by Reinke:

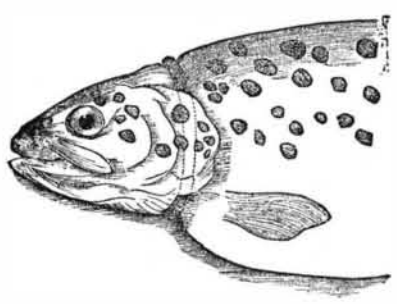
These experiments prove that there exist in the tissues of plants of very different families easily oxidizable substances, which probably belong to the aromatic series. That these substances perform a not unessential function in the exchange of matter can scarcely be doubted. In quantity, it is true, they are inferior to other constituents, and it would be a very tiresome and tedious labor to establish their exact chemical constitution, because for this purpose large quantities must be used. But it is just those very substances which are always present in very small quantities that interest the physiologist, because they are supposed to belong to the important members in the process of the interchange of matter (stoffwechsel), and which, therefore, never can accumulate in large quantities, but without a knowledge of them there can be no real understanding of that process.

The most natural hypothesis regarding the bodies mentioned is that from a physiological point of view they belong to the retrogressive series, and are, perhaps, formed directly by a splitting up of the albuminoids, or by synthesis from the products into which they split. We may also surmise that there is some connection between them and the functions of breathing.

In regard to this last point a short remark may be permitted. If in the living cell, for example, the rhodogen is oxidized to carbonic acid and water, and the former escapes in the breathing process, we could think that the whole breathing of the sugar beet consisted in this oxidation of rhodogen, and that other substances like sugar, that disappear in the breathing process, are only consumed indirectly to produce more rhodogen. But this supposition does not seem to me to be the most probable one. I believe that we have no cause for doubting the direct oxidation of carbohydrates by taking up oxygen; only such an oxidation is scarcely supposable unless the oxygen is first rendered active. Now, inasmuch as the rhodogen is able to split the O_2 molecule, and unite with one of its atoms of oxygen, it may render the other oxygen atom disposable for carrying out an energetic oxidation elsewhere. Thus, rhodogen may act as an oxidizing agent, analogous to what Hoppe-Seyler has proved for atomistic hydrogen. The theory advanced by the last-named investigator of physiological oxidation, permits of a great widening, if we grant that not only nascent hydrogen, but also certain compounds which break the molecule of oxygen, possess the power of rendering the oxygen active. In this way we arrive at a principle of oxidation which is capable of the broadest application.—*Naturforscher, No.* 20.

TROUT WITH ELASTIC BAND.

Our correspondent, Mr. W. Hearder, of Plymouth, has sent us the following drawing to illustrate a curious circumstance of a trout not only living but thriving with its gills compressed in what one would imagine to be a very painful manner, highly prejudicial to health. Mr. Hearder writes: "Mr. Charles Clarke, while fishing in the Plym, hooked a trout about eleven inches long, which had an India-rubber band over the head. The band slipped back over the gill



covers, and was compressing the gills. The horny part of the fish, which extends from the center of the lower jaw to the belly and divides the gills, is deeply dented where the band has evidently been pressing, and it has made quite a cavity under the lower jaw. I should like to know if anybody has marked the fish with the band, or whether it got its head through in an attempt to take it for a bait. How the fish lived is a mystery. It is in splendid condition, and I have preserved it for my museum."—*Land and Water.*

How Singers Should Live.

Women singers, especially in the country, are addicted to three habits which are about equally prejudicial to them as singers. These three habits may be described as the habit of taking irregular and insufficient food, the habit of tight lacing, and the habit of eating candy. I know half a dozen bright American girls, who have really excellent prospects as singers, whose voices are already beginning to betray the fact that their owners live on "lunches" and "candy" rather than three square meals a day. It is very certain that there never will be any tone to a voice that comes from an insufficiently and irregularly nourished body. On the subject of tight lacing a book might be written with ease. Many a girl who now finds great difficulty in taking a high note might do so with comfort if she would only give herself room to breathe. In brief, it may be truly said that no teaching however able, no industry or talent however great, in the pupil can amount to anything unless the would-be singer is content to live a good, clean, honest, healthful life, trusting to good common-sense rules of living, and plenty of fresh air rather than to quacks and nostrums. If vocal teachers, before commencing their lessons, would take the trouble to find out how the pupil lives, and would refuse to give any instruction until the pupil was ready and willing to conform to the simplest rules of hygiene, a great many troubles, especially throat troubles, would be avoided, and the act of singing, instead of being a painful, miserable, ear torturing effort, would be easy and as pleasurable to the singer as to the listener. The rules of life, which the student should observe, are just as important for the singer, private or public; if anything they are more so, for the strain is greater. One thing is certain, the reliability of a singer depends absolutely on the method and manner of life.—*Music.*

Earth Vibrations.

Professor H. M. Paul ingeniously employs reflected light as a means of testing the vibration imparted to the earth by moving vehicles. His arrangement is a very simple one. He sinks a stout post some four and a half feet into the ground, and upon this is a plank supporting a reservoir of mercury—or, rather, of amalgam of tin and mercury. The surface of the mercury is obviously a mirror, and when any vibration is felt by the earth the surface of the mercury is disturbed more or less. An object of a suitable kind is reflected upon the mercury surface, and when there is no vibration this reflected image is, of course, sharply defined. As soon, however, as any vibration occurs, the image moves, and becomes more or less exaggerated.

Professor Paul has hitherto employed a telescope to note the amount of vibration, taking optical notes the while; but the *Photographic News* thinks there is little doubt that photography would help materially in registering the degree of change or vibration. He has found that an express train passing at a distance of one-third of a mile affects the mercury very considerably for a space of two or three minutes, and a one horse vehicle, passing at a distance of five hundred feet, caused a disturbance of the image on the surface of the mercury whenever one of the carriage wheels passed over a stone.

A Dinner Within a Statue.

A few days ago M. Bartholdi, the designer of the colossal statue of "Liberty Enlightening the World"—which is to be erected near New York in commemoration of the American War of Independence—entertained a party of his friends at luncheon. The table was laid in the lower folds of the drapery of the figure. MM. Gaget, Gauthier & Co., of Paris, the contractors for the erection of the statue, have been obliged to take a plat of ground adjoining their foundry, and covering 3,000 square meters, upon which the scaffolding has been fixed. The interior of the statue contains an iron backing, to which are attached the exterior parts, consisting of bronze plates, about one-tenth inch thick by 4 feet 7½ inches square—the largest size made in the trade. The plates are kept together by rivets that are invisible from the outside. The plates of bronze are made to correspond with the contours of the model in an ingenious way. A skeleton of fine wickerwork was first formed, and this was covered with a thick coat of plaster moulded to an exact reproduction of the original. Upon the plaster 6-inch templates of thin wood are adjusted, and are then given to the bronze-workers for models. The weight of the figure will be about 150 tons; the height from head to foot about 110 feet; and from the end of the torch raised in the right hand to the feet, 140 feet. The cost of execution will exceed £28,000, and the work will require five years for completion.

Torpedo Experiments at Newport.

The examination of the graduating class at the Newport Torpedo School was completed August 4. Part of the exercises consisted in a public test of the device of Captain T. O. Selfridge for protecting a ship at anchor from an enemy's torpedo by means of a net and countermines. The vessel is surrounded by a line of torpedoes, which can be individually exploded so as to destroy an attacking torpedo passing near it. The same device can be used to guard the entrance to a harbor.

Another important experiment was a demonstration of the working and efficiency of Lieutenant J. C. McLean's electrical machinery for controlling the movement of a torpedo launch from the shore. The launch, no one being on board, was made to start, stop, back, go to port and to starboard, and to drop and fire mines and countermines, which were rigged at the ends of spars placed on each side of the launch's bow. Lieutenant-Commander Royal B. Bradford, who was at a keyboard on shore, had perfect control of the launch by the aid of one wire. The electrical part of the experiment was in charge of Lieutenant-Commander Caldwell, who was in the electrical building at the torpedo station, at a long distance from the spot where the keyboard was located.

THE State Bureau of Statistics has compiled from the reports of township assessors a statement of the number of rods of drainage tile laid in the several counties of Indiana. The aggregate shows nearly 26,000 miles of tile drainage, with nineteen counties to be heard from.