

THE PARADISE FISH AND ITS NEST.

BY C. F. HOLDER.

Those who are familiar with the difficulties that attend the transportation of foreign and tropical fish to this latitude will appreciate the fact that two paradise fishes (*Macropodus viridi-auratus*) have been safely brought from India, and are flourishing in an aquarium in the museum room at Fulton Market. They seem perfectly acclimated, and it is hoped that they may be introduced into American waters in the latitude from which they were taken. That they would prove an acquisition, no one could doubt after a contemplation of their movements, and I am indebted to Prof. H. J. Rice for opportunities for examining them.

In its native country the paradise fish has a somewhat unenviable reputation, being pugnacious in the extreme; so much so, indeed, that it is used by the Siamese very much as the Malays use the game cock.

The native name of the fish is plakot, and in every town they can be found kept in glass jars and domesticated to a remarkable degree, the possibilities of which are well shown in the actions of the Fulton Market specimens. The Siamese use the fish principally in fighting, the method being to place them in glass vessels near each other, when they soon become enraged. When fully aroused they are placed together, and the result is attended with all the excitement of the prize ring, the natives betting large sums on the contest.

The following account of the appearance when excited of a variety of this fish reared for fighting purposes, is given by Dr. Cantor:

"When the fish is in a state of quiet, with the fins at rest, the dull colors present nothing remarkable. But if two are brought within sight of each other, or if one sees its own image in a looking-glass, the little creature becomes suddenly excited, the raised fins and the whole body shine with metallic colors of dazzling beauty, while the projected gill membrane, waving like a black frill round the throat, adds something grotesque to the general appearance. In this state of irritation it makes repeated darts at its real or reflected antagonist. But the fish, when out of each other's sight, instantly become quiet. This description of their actions was drawn up in 1840, at Singapore, by a gentleman who had received a present of several from the King of Siam. They were kept singly in glasses of water, fed with the larvæ of mosquitoes, and had thus lived many months. The Siamese are infatuated with combats of these fishes, and sometimes their liberty, and that of their families, is staked on the issue. The license to exhibit fish fights is farmed, and yields a considerable revenue to the crown."

After such a description one would naturally expect to see a fish of a somewhat ferocious aspect, but, on the contrary, the Fulton Market specimens seem to be thoroughly domesticated, and on the best terms of good fellowship. This is probably owing to the fact that the pair are male and female.

They are somber little creatures, calling to mind our pomotis in general shape, though in an instant they seem to transform themselves into an entirely different creature, a paradise fish in the true sense of the word. They are about 3 to 3½ inches in length, of a sober greenish-brown hue, with darker and small spots. When moving along quietly, they look very much like some of the peculiar forms of gold fishes with trilobed tails, and would, perhaps, attract but little attention. If anything occurs to excite them, the change is instantaneous; the dorsal and caudal fins develop into enormous fans, and appear to vibrate with excitement. Each ray springs into an erect position, booming out the living sail, as it were, so that the fish appears to have almost doubled its size.

The secret of this transformation is seen by an examination of the fins. The dorsal and anal fins are alike, and commence in the same relative position, as shown in the accompanying illustration. They extend back for half an inch, retaining the same height, then suddenly enlarge, the rays reaching gracefully away, like plumes, so that they extend beyond the end of the vertebral column an inch or more. Here they seem to join the tail, which is almost twice the width of the fish, also ending in points.

With such an array, the movements of the fish could not be other than graceful. The waving plume-like appendages were constantly in motion, forming graceful curves as the fish darted about, expanding when they remained stationary, and closing when swimming,

affording a continual change of picturesque attitudes to the observers. Every motion of my hand or finger against the glass was quickly noticed, and they would instantly arise to the surface. Professor Rice informed me that they readily fed from his hand, a common trick of the common sunfish. I recently possessed one of the latter that not only took flies from my hand, but would thrust its head out of water as far as the pectoral fins to take them.

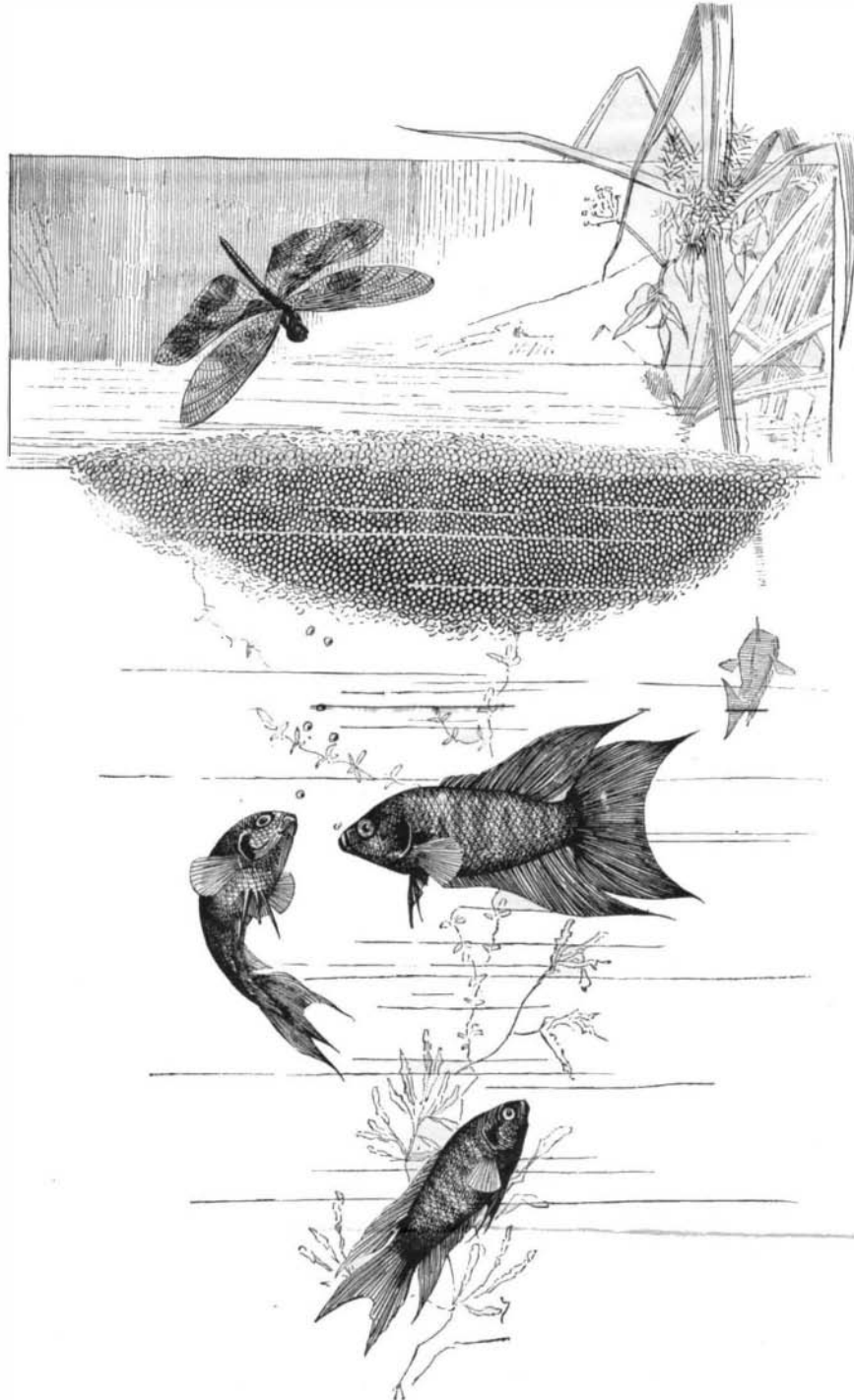
So active are the paradise fishes, alive to every movement, that they present a strange contrast to the clumsy golden carp in the same tank. All the fins become erect in a manner that reminds one of the sudden spreading of the peacock's tail. There was also another curious movement that seemed to quite change the expression of the fish. As soon as they met they remained stationary, face to face, for a moment, each expanding or opening the gill covers, so that they appeared puffed out at quite an angle, exposing the red gills quite plainly from behind. This salute, or whatever it was, was performed four or five times in as many minutes; in fact, every time they met in their

open water, and the mass of bubbles was comparatively small and easily blown apart by the breath. Age would, however, soon render the nest more compact; fungoid growths would seal the bubbles together, and in a short time the nest would be of a consistence to resist the strongest breeze. When the fish had completed his labors, he began to chase the female about, endeavoring to drive her in the direction of the nest, but in this he failed, she probably not being ready for the maternal duties.

In their native streams the female deposits her eggs under or in the mass of bubbles; there they are held until hatched, the young at first feeding from the mucous spittle, if so it may be termed, of which the nest is made. Professor Rice suggested to me that it was possible that there was more architectural ability shown in the structure of the nest than would appear from a casual glance, and that the eggs were not deposited at random in the mass, but found their way into the upper portion, that he thought might be a pseudo air chamber formed by the extreme upper layer of bubbles and the layer resting upon the water.

Whether this is the case will be determined when the eggs are deposited. It would appear more likely that they are deposited at random, and cling wherever they are caught by the bubbles.

A large number of marine fishes deposit their eggs either upon the surface or in position where they ultimately rise, and those of the angler are enclosed in a long gelatinous ribbon; but in the paradise fish we find a decided improvement, as if the fish had learned by experience that if its eggs became separated they would fare badly; hence the bubble nest was extemporized to keep them together at the surface, where, perhaps, in the disguise of a mass of froth, they float about, safe from all predatory enemies.



NEST OF THE PARADISE FISH.

movements up and down the tank. At times they would face each other, and, while retaining the same relative position, move round and round each other, their plume-like fins waving behind and presenting an attractive appearance.

The nest building, which Professor Rice has been fortunate in observing, is carried on, as is the rule with other nest building fishes, entirely by the male. Approaching the surface of the water, he sucks in a mouthful of air with a clicking sound, and descends six or eight inches below, then facing the surface he releases the air in small mucus covered bubbles, that rise to the surface, joining together, adhering, however, very lightly at first. Another mouthful of air is taken and other bubbles added, until finally a platform of these floats rests upon the water, forming a raft, perhaps four or five inches in diameter. Others are then added that tend to lift the upper layer, so that it has a convex surface, or resembles a watch crystal. Bubbles are added until the nest is three or four inches deep, according to circumstances, and undoubtedly it is often larger. In Professor Rice's aquarium the nests were, perhaps, not as complete as they would have been in

quantity of fluid in the stem, still there is not the same amount of nitrogenous fermentable principles as are found in spring and autumn.

If the tree be a hard wooded one, the period of the year at which it is felled does not matter to any great extent. In order to render the wood fit for timber, it must be thoroughly seasoned by slow drying. If the wood is to be used in an exposed position, the moisture with which it naturally comes into contact would be liable with the constituents of the sap to cause decomposition, hence water seasoning is frequently resorted to. A running stream being chosen, the logs of wood are sunk in it for about two or three weeks, after which they are taken out and seasoned by slow drying; in this process all the constituents of the sap are washed away, and fermentation or decomposition is thus prevented. Other means employed to preserve wood which is exposed to moisture from the soil, such as gate posts, telegraph poles, hop poles, and railway sleepers, are: (1) charring the outer surface; (2) painting, using with the paint fine sand, pumice, or finely powdered glass, which has been previously incorporated; (3) immersing and standing in bitumen, tar, or creosote; in either of

The Nature and Treatment of Different Woods.

From a paper read before the Chemists' Assistants' Association, London, by John Woodland, F.L.S., the following interesting and useful facts are gathered. Wood, commences the lecturer, is a hard, permanent, cellular, and vascular structure, formed by plants. The following woods are used when elasticity is required: ash, hazel, hickory, lancewood, and yew. The following are in use when toughness is required, combined with elasticity: beech, elm, hornbeam, oak, and walnut. For durability in dry situations, cedar, chestnut, oak, poplar, and yellow pine are chosen. For coloring purposes, Brazil wood, camwood, logwood, and Nicaragua wood are used to furnish a red, green ebony a green, and fustic a yellow color. For ship building, elm, fir, larch, pine, and teak are used. For piles, as supports for piers or landing stages, etc., alder, beech, elm, oak, and plane are in common use. For house building purposes, the ash, chestnut, fir, oak, pine, and sycamore are much used. When hard woods are required, box, lignum vitæ, and mahogany are serviceable.

Timber is wood which has been prepared from trees or shrubs, so as to be fit and durable for the purpose for which it is selected. When soft or moderately soft wooded trees are to be felled, mid-winter is the best period of the year, on account of their containing the least amount of sap at that time; the next best period being the middle of summer, as, although at this latter period there is a large

which cases the wood is penetrated to the center by the preservative material; (4) the process termed "kyanizing," which is now obsolete, and consisted of impregnating the wood with perchloride of mercury by means of a solution of the salt; (5) a process called "Burnettizing," which has proved so successful at Woolwich, and consists of soaking wood in a solution of zinc chloride made in the proportions of one pound of the chloride to five gallons of water.

A splendid example of the preservative action of salt on wood is seen in the salt mines of Poland and Hungary, the wooden supports in which have existed for ages.

Wood, when exposed to a damp surface and not well ventilated, is often attacked by fungi, commonly called dry rot, the mycelia of which rapidly spread, till in time the hard wood is replaced by a small, powdery looking substance. As this fungus only attacks wood when it is moist, the term "damp rot" is obviously more correct.

Mr. Woodland then enumerated some ordinary woods, together with their sources and what peculiarities they may furnish.

**Alder**, obtained from *Alnus glutinosa*, Betulaceæ.—Especially adapted for withstanding the action of water, hence is used in connection with cog wheels of mill stones, pumps, drains, piles in water or mud, heels of wooden boots, etc. The best gunpowder is also made from the charcoal furnished by the alder.

**Ash**, obtained from *Fraxinus excelsior*, Oleaceæ.—This wood is lighter in weight and more elastic than that of the oak, and is less liable to be broken by a cross strain, hence its use for billiard cues, poles, ladders, etc., but being fibrous it is more easily split than the oak. The yule logs of Christmas celebration were formerly furnished by this tree.

**Aspen**, from *Populus tremula*, Salicaceæ.—The wood is not so good as that furnished by the white poplar, being porous, soft, and white; it is chiefly used for field gates, milk pails, packing cases, etc.

**Beech**, from *Fagus sylvatica*, Cupuliferæ.—The wood is brittle and hard, but is apt to decay soon; carpenters' plane frames and other tool handles are made with it, and cabinet makers use it for shelves, etc. Next to the oak this is the largest tree growing in England. Of this wood the Greek ship *Argo* was built, and in ancient times the wine bowls were made of it.

**Birch**, from *Betula alba*, Betulaceæ.—This is one of the aboriginal trees of our island, as shown by the presence of twigs still retaining their silvery bark which are found in the lower strata of the peat bogs existing in the North of England and around Manchester. The wood known as Norway birch is much used in the Highlands and further south for making wicker hurdles, tying fagots of wood, and thatching straw roofs. It is from the bark of this tree that an oil is yielded from which the peculiar odor of Russia leather is derived.

**Brazil wood**, obtained from *Cesalpinia crista*, Leguminosæ.—This wood is used for dyeing purposes, the colors obtained being red, rose color, and yellow. **Brazilletto wood** is furnished by *Cesalpinia brasiliensis*, and produces red and orange colors.

**Box**, from *Buxus sempervirens*, Euphorbiaceæ.—The boxwood of commerce comes from Turkey, Asia Minor, Circassia, Spain, and Portugal. This wood, being very close grained and heavy, is largely used by turners, engravers, and carvers, also for the manufacture of mathematical instruments and articles that will take a high polish; the pure bitter it contains preserves it from the attacks of insects.

**Cherry**, *Prunus cerasus*, Rosaceæ.—This wood is hard and tough, also light and porous; it is used by turners and engravers, and for constructing pipes.

**Chestnut**, from *Castanea vesca*, Cupuliferæ.—The timber is chiefly used for beams and rafters of houses, heads and staves of casks, and as protecting gutters for gas pipes, etc., underground. There is one plant growing at Tortworth in Gloucestershire more than 1,100 years old. The diameter at base is 15 feet.

**Dogwood**, *Cornus sanguinea*, Cornaceæ.—The wood is used for preparing gunpowder charcoal, and, on account of its hardness, for skewers, cogs for wheels, etc.

**Ebony**, from *Diospyrus ebenus* or *Diospyrus ebenaster*, Ebenaceæ.—The heartwood only of this tree is black, and being very hard, durable, and wear-resisting, its uses are many and various; besides this wood, which is known as "Bastard Ceylon Ebony," we have a black ebony yielded by *Diospyrus melanoxylon*, also a fine variegated wood yielded by another species, namely, *Diospyrus quasita*, which makes handsome furniture. There are also red and green ebony woods.

**Elder**, from *Sambucus nigra*, Caprifoliaceæ.—This plant while young grows with great rapidity, but when it attains the height of from 20 to 30 feet, its growth is arrested. When young the wood is soft, but when old it becomes almost as hard as boxwood, and in a variety of cases can be substituted for it; butchers' skewers and tops of fishing rods are commonly made of this wood.

**Elm**, from *Ulmus campestris*, Ulmaceæ.—The wood

is hard, finely grained, and hence not apt to crack. It is used for the keels of vessels and wooden fittings of ships, also for cart wheels and coffins; it attains its maturity at an age varying between seventy and eighty years.

The **Whych Elm**, from *Ulmus montana*, Ulmaceæ, furnishes a wood that is both strong and elastic, hence it is used for spade handles, garden forks, and rake handles. The gnarled wood is largely used by cabinet makers for veneering. Both this and the preceding elms furnish woods which are tough and not readily acted upon by water.

**Fir trees** belong to the genus *Abies* of the natural order Coniferæ; they were formerly called "fire trees" on account of the inflammability of their wood, due to the oleoresin it contains. These trees having a conical shape can thus be told from what are termed "pine trees;" one fir tree (*Abies excelsa*) is the tallest in Europe, its average height being 150 feet. Cf. *Pine*.

*Abies excelsa* is the Norway spruce, and furnishes the white deal used so much for building purposes. *Abies picea* is the silver fir. The stems of each of these fir trees are largely used for making masts, telegraph poles, signal poles, and building planks, and also for splitting up into matches.

**Fustic**, obtained from *Morus tinctoria*, Moraceæ.—The wood in chips is largely used as a dyeing agent.

**Guaiacum**, from *Guaiacum officinale*, Zygophyllaceæ.—This wood (the heartwood of the plant) is commonly called "lignum vitæ" on account of its durability and hardness; it is peculiar, in that the fibers composing it cross each other diagonally, so that cleavage of the wood is difficult. It is much used for making rulers, skittle balls, wheels, and cogs for sugar mills, pulleys, etc.; in parquet flooring, by heating the flat pieces of lignum vitæ, the natural resin exudes and aids in agglutinating it to its neighboring pieces.

**Hazel**, from *Coryllus avellana*, Cupuliferæ.—The wood is very tough and flexible, and is used in making hurdles, crates, fishing rods, hoops for casks, etc. A forked twig of hazel was reputed to have the power, when held in the hand of a suitable person and pointing to the ground, of a divining rod, by directing the holder to a place underneath which water exists.

**Hickory**, from *Carya alba*, Juglandaceæ.—The wood is tough and elastic, and will stand prolonged strains; it is used for fishing rods, walking sticks, Canadian paddles, etc.

**Hornbeam**, from *Carpinus betulus*, Cupuliferæ.—The wood is hard, tough, and white; it will burn like a candle, so with frayed ends will act as a temporary torch. It is chiefly used for the manufacture of agricultural implements and the cogs of mill wheels.

**Lancewood**, obtained from *Duguetia quitarensis*, Anonaceæ, or according to another authority, *Guatteria virgata*.—This wood is tough and elastic to a very high degree, and being at the same time of light weight it is admirably adapted for making shafts of carriages, bows and arrows, fishing rods, and lances.

**Larch**, obtained from *Larix Europæa*, Coniferæ.—The wood is fit to use for timber when the tree is forty years old; there is a great objection to its use on account of its warping, even after having been seasoned. It was formerly and superstitiously believed that the wood was impenetrable by fire. The American larch, called "hackmatack," is a heavy and cross grained wood.

**Lime**, obtained from *Tilia Europæa*, Tiliaceæ.—This wood, called commonly "linden wood," is used by carvers and turners, owing to its being close grained and smooth.

**Mahogany**, from *Swietenia mahagoni*, Cedreliaceæ.—This well known wood is sent from Central America and the West Indies. Some trees have been known to produce as much as £1,000 each.

**Maple (red)**, from *Acer rubrum*, Aceraceæ.—A variety of this produces curled maple, so called from the accidental undulation of the fibers; it one of the most ornamental woods known. It is used for furniture making and also for making stocks of rifles and fowling pieces.

**Maple (sugar)**, *Acer saccharinum*, Aceraceæ.—This furnishes the so-called "bird's eye maple," and is highly prized for furniture making.

**Mountain Ash**, or **Rowan tree**, from *Pyrus aucuparia*, Rosaceæ.—The timber is much used for carriage and cart wheels.

**Oak**, from *Quercus robur*, Cupuliferæ.—This tree in temperate climates is the largest in size, the longest lived, the hardest and most durable as regards its timber, and most common of trees. The oak which has stalked acorns furnishes the best timber, which possesses great strength, tenacity, and durability. The white American oak, *Quercus alba*, has a reddish timber, which, though more elastic than the English kind, is not so durable. Red oak, *Quercus rubra*, furnishes a deep colored timber, which, being coarser in texture, is not so useful. Oak bark is used for tanning.

**Pear**, from *Pyrus communis*, Rosaceæ.—The variety furnishing the hard or baking pears has a very hard wood, which is used chiefly for musical instruments, tool handles, etc.

**Pine trees** belong to a genus called *Pinus*, Coniferæ.—The trees can be told from fir trees by being more or less flat at the top, where nearly all the branches congregate. **Scotch Fir**, *Pinus sylvestris*, yields the timber known as Dantzic or Riga fir, and Russian deal. It grows from 60 to 100 feet high, and is fit for timber at the age of 50 or 60 years. The best quality timber is from trees that have grown in cold situations, such timber equaling the oak in duration. *Pinus strobus* furnishes the white pine or deal of the United States; it is called the "Weymouth pine." The wood is used for bowsprits and yards of men of war. *Pinus mitis* and *Pinus palustris* furnish yellow pine or deal. The latter pine will grow in very sterile soils, yet yields a wood which is more compact, stronger, and durable than that obtained from the other species. The least valuable of the pines is the *Pinus taeda*, or "loblolly pine," the timber of which decays on exposure to air. The uses of pine trees are similar to those of fir trees.

**Plane**, from *Platanus occidentalis*, Platanaceæ.—The wood is a fine grained one, and becomes of a dull red color in the seasoning; it is occasionally used by cabinetmakers, but quickly decays if exposed to the weather.

**Poplar**, from *Populus alba*, Salicaceæ.—Wood is white, light in weight, and soft; it is not used for any purpose in particular, though that of the Canadian poplar, *Populus monilifera*, is largely used for flooring. One poplar, namely, the balsam poplar, *Populus balsamifera*, in the form of timber, is quickly rotted by water, like the wood of the horse chestnut, hence, to protect the young beds of these trees from moisture, as rain, etc., we find a thick covering of resin present during winter and spring.

**Sandalwood**, from *Santalum album*, Santalaceæ.—This wood is sent from Malabar and the East Indian Islands. It is used for making small articles of cabinet furniture, and its odor prevents insects or worms attacking it.

**Spindle tree**, from *Euonymus Europæus*, Celastraceæ.—This wood is hard, white, and finely grained; it is used for musical instruments, netting needles, spindles (hence the name of the tree), and skewers. In France gunpowder charcoal is obtained from it, and the young shoots when charred form a rough drawing pencil.

**Teak**, or **Indian oak**, from *Tectonagrandis*, Verbenaceæ.—This wood is very strong and durable. It is largely used in ship building.

**Tortoise wood**, so called from the resemblance of the wood to tortoise shell, is obtained from *Guettarda speciosa*, Rubiaceæ, and the same plant is by some authorities said to yield the striped or zebra wood used by cabinet makers.

**Walnut**, from *Juglans regia*, Juglandaceæ.—This is now largely in use for furniture. Before the introduction of mahogany this was almost exclusively used for furniture making. It is also used for gun stocks, as it is lighter in proportion to its strength and elasticity than any other wood. Black walnut, from *Juglans nigra*, furnishes a strong and tenacious wood, and when well seasoned is not liable to warp or split; it is also secure from the attacks of insects.

**Willows**.—The Goat Willow, or Sallow, *Salix caprea*, furnishes the best willow timber; when growing as a coppice plant, it furnishes hoops, poles, and rods for crates. The timber of the willow is white, soft, and light, the best seasoned kinds being very durable. The dwarf willows, *Salix viminalis* and *Salix rubra*, are propagated by cuttings for furnishing osiers or willow shoots, from which hampers, baskets, etc., are made.

**Yew**, from *Taxus baccata*, Taxaceæ.—The wood is peculiarly hard, smooth, and tough, and was formerly used for making bows; it is beautifully veined and will take a high polish, hence is used by cabinetmakers for veneering purposes; being very hard and durable, it is used for cogs for mill wheels, axles, and also floodgates of rivers, which scarcely ever decay.

**Zebra wood**. See Tortoise wood.

#### To Restore Color.

It is customary to use ammonia for the purpose of neutralizing acids that have accidentally or otherwise destroyed the color of fabrics. This must be applied immediately, or the color is usually imperfectly restored. After careful use, an application of chloroform will bring out the colors as bright as ever. Plush goods and all articles dyed with aniline colors, faded from exposure to light, will look as bright as ever after sponging with chloroform. The commercial chloroform will answer the purpose very well, and is less expensive than the purified.

#### A Good Idea.

Some one in the *London Field* suggests that "if a man wants a carriage or implement photographed so as to make a working copy to scale, all that is necessary is, when the photo is being taken, that a clear and distinct 3 foot rule be placed on the carriage; this is photographed along with the carriage, and no matter what the size of the print or negative, will always be a true scale. It enlarges and diminishes in exactly the same proportion as the carriage.