

Teaching Animals to Converse.

H. Stuart Wortley writes as follows to *Nature*: A dog of mine knows instantly whether he may go out with my housekeeper or not, according to whether she wears her hat or her bonnet. In the first instance he knows she is going where he may go, and he is on his feet barking with joy as soon as she appears. If she has the bonnet on, he knows it to be church, or a visit to friends in the country, where he cannot go, and, like the "eldest oyster" (I quote from memory), he "winks his eye, and shakes his hoary head." If drawings of hat and bonnet were made, he would know them at once.

Some years since I had a remarkably clever Skye terrier, whose wisdom was at the time shown in a letter to the *Times*. This dog I taught as follows: When I went out it was quite sufficient to say "Yes" or "No" in an ordinary tone; but wanting to take him beyond that, I taught him very quickly to know the two words when printed on cards, YES or NO, and after a few weeks' teaching he never mistook them. I have no time now for much teaching; if I had, I am sure it could be done with the dog I now have.

The intelligence of cats is greatly underrated. My wife's favorite cat follows her everywhere, and comes when called wherever she may be. Cats, too, are very grateful for kindness. When I went into the Malakoff, I found a cat on whose paw a bayonet had fallen and pinned it to the ground. I released it and took it home, and it always followed me all over camp till the end of the war. And this cat did as follows: I took her to a doctor of the nearest regiment for two mornings to have her foot dressed. The third morning I was away on duty before daylight, and the cat went herself to the doctor's tent, scratched the canvas to be let in, and then held up her paw to be doctored. The intelligence that can be developed in almost any animal depends in most cases on our treatment of it.

The Duty on Works of Art.

The tariff act of 1883 advanced the rate of duty on paintings in oil or water colors, and on statuary, to 30 per cent *ad valorem*, instead of 10 per cent, as it had theretofore been. The imports under this head for the fiscal year 1882 were \$2,550,000, and the late tariff commission recommended a duty of 40 per cent. Representative Perry Belmont, of New York, has now introduced a bill wholly exempting from duty works of art, ancient or modern, the term to be construed as including all paintings, drawings, and photographs, and statues of marble or other stone.

The argument favoring a high duty on this class of imports can have no other foundation than that such goods are brought here only by the rich, as luxuries, and for that reason should pay as high a revenue to the Government as possible. But there is another side to the question. Works of art are educators of the people, and, in public galleries or private collections, they exert a far-reaching influence in elevating the taste and exalting the ideals which touch the mainsprings of human life.

No question of protection or of free trade can enter into any consideration of placing a duty on such products, for the American artists are strenuous supporters of the Belmont bill, and the most of them, also, feel it a necessity of their education that their opportunities for studying European work, modern as well as ancient, shall be as free and unrestricted as possible. This, therefore, seems to be a case where we should adopt Goethe's saying, "Encourage the beautiful; the useful will take care of itself," to the extent, at least, of allowing artists' work to be imported duty free.

Sagacity of the Horse.

On my farm, one Sunday, the house was left in charge of one man, who sat on the porch reading. A mare, with her young foal, was grazing in the orchard near by. At length he saw the mare coming from a distant part of the orchard at full speed, making a loud outcry—a sort of unnatural whinny, but, as he says, more like a scream of distress than the natural voice of the horse. She came as near to the man as the fence would allow, and then turned back for a few rods, and then returned, all the while keeping up the unnatural outcry. So soon as he started to follow her she ran back in the direction of a morass or miry place which had been left unguarded, and only stopped on its very brink. The man hastened to the spot with all speed, and found the colt mired in the soft mud and water. It was already dead. —J. D. Caton, in *American Naturalist*.

Beauties of the Cable System.

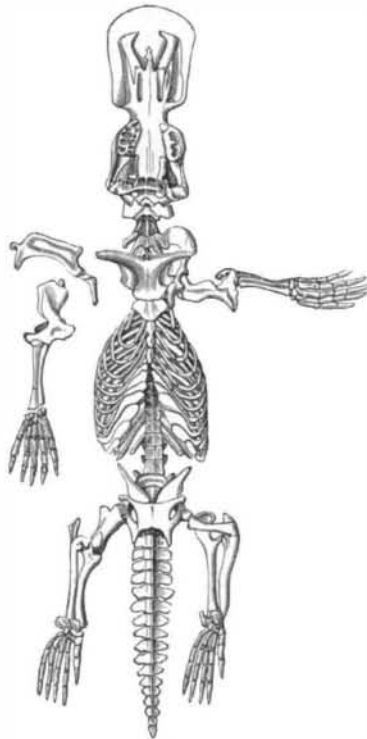
The Chicago street cable cars came to a sudden stop the other day by the breakage of a cog on one of the main driving wheels. Horses had to be substituted on the entire line for a day or two.

THE ORNITHORHYNCHUS.

(*Ornithorhynchus paradoxus*.)

BY L. P. GRATACAP.

This interesting animal has proved both a perplexity and a delight to naturalists. Its little body is so curiously constructed as to remind the student of structural affinities in animals of three types of life—the mammals, birds, and reptiles. It undoubtedly belongs to the former, but it enters that class at its lowest point, and brings along with it features and reminiscences of more degraded forms than itself. It is a welcome gift to the evolutionist, and he has not been loth to emphasize every indication it gives of its intermediate and connective character. In spite of these suggestive



SKELETON OF THE ORNITHORHYNCHUS.

resemblances the ornithorhynchus is essentially *mammalian*, though holding the humblest position in this group. With its singular ally, the *Echidna*—the porcupine anteater—it forms the division of *Ornithodelphia*, and is especially characterized by a strange provision in its economy, by which the feces and young are extruded through the same passage, as the spacious cloaca is common to the rectum, genital, and urinary organs. Hence, the technical appellation of *Monotremata*.

The features which ally it to the amphibia or reptiles are chiefly found in the skeleton, and are the following, among others less obvious: A projection of the second neck verte-

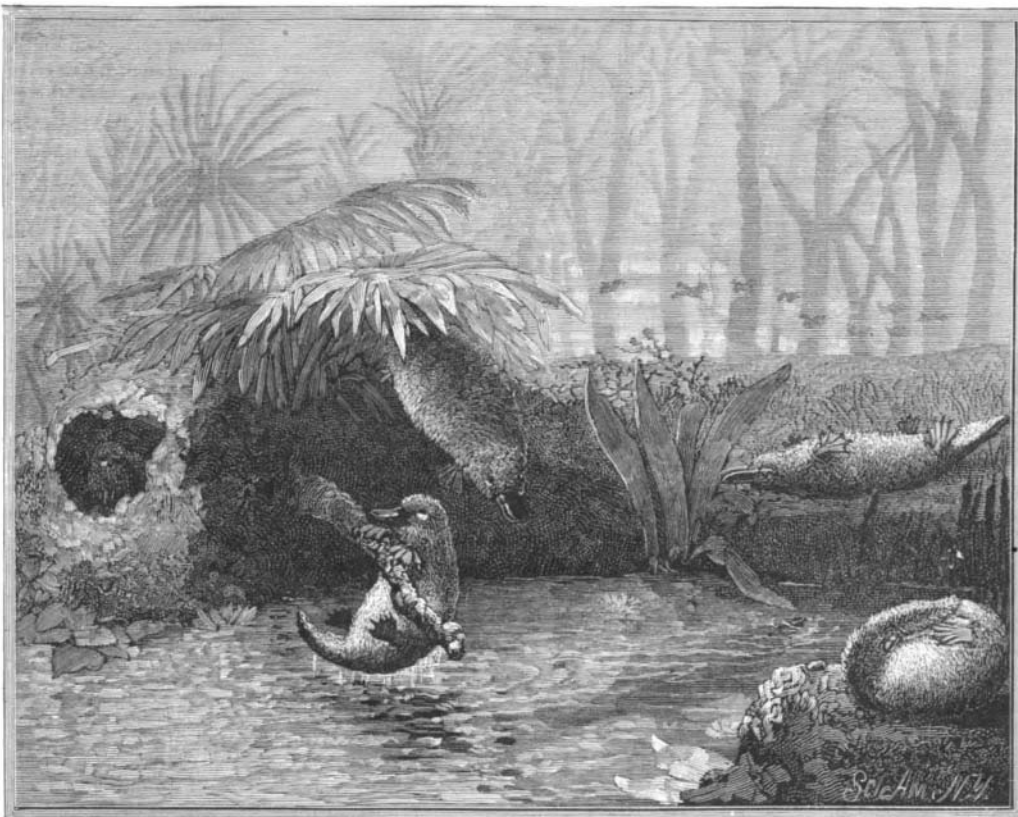
mammals alone there is a T-shaped bone supporting the shoulder blades or clavicles. The *acetabulum*, or cavity, into which the head of the femur is thrust as in a socket, remains unossified at its center, thus resembling birds and crocodiles. Other points in its anatomy and physiology strongly suggest its indeterminate and dependent character, but its nature and functions place it beyond appeal among the mammals as a class.

The ornithorhynchus, by its grotesque union of the externals of a duck, beaver, and mole, its restricted range geographically, and the singular and unwarranted tales told of its habits by natives of Australia, has always formed a natural curiosity, and been regarded with mingled feelings of amusement and astonishment. The first skin of this animal sent to England presented such anomalous features that it was regarded as the playful hoax of some ingenious collector. A duck's bill and a mole's body presented a zoological complication which at first could not be considered seriously.

The ornithorhynchus is about the size of its congener the echidna, having an average length of 50 cm. (1 ft. 7.6 in.), 12 of which measure the normal length of its tail. The males are larger than the females. The flattened body is not dissimilar in some aspects to that of the beaver or fish otter. The bones are short, each foot or paw is provided with five claws, which are webbed, and this integument on the front feet is developed to such a degree as to extend beyond the extremities of the claws; it folds or draws back at the will of the creature, permitting it to use its serviceable talons or nails for digging and excavating. The short hinder feet are turned backward, and are usually placed in that position, and the nails, which are longer and sharper than those of the front feet, are similarly bent backward. In the males, above the toes of the hinder feet, there is a spur which admits of considerable movement. The tail is flat, broad, abruptly terminated, and in the younger specimens provided plentifully with hair, which disappears with age.

The head is quite flat, and forms the most distinguishing feature in its appearance. It is small and furnished with a duck bill, at the base of which a leathery apron-like expansion is developed, which acts as a shield, protecting the eyes when the animal burrows in the ground, and guarding the fine fur behind it from the slime of the muddy bottoms where it searches for its food. The jaws are prolonged forward and carry no teeth; the margins of the duck-like bill are sheathed with horn and crossed with horny plates. The tongue is fleshy, armed with horny carunculations and terminated at its base by a ball-like swelling which closes the throat. The eyes are small, and the barely noticeable ears, sunk in the head near the outer angle of the eyes, are closed at will. The fur on the upper surface of the animal is dark brown, sometimes reddish; it is composed of one set of long hairs which are somewhat stiff, and of another shorter growth of fine gray hairs, similar to the woolly coating of the seal. The fur on the breast and neck is silken and yellowish. The bill is black, spotted with light points, and is red at its extremity. The fur of the tail varies in color, which has given rise to suspicions of different species, and in the younger individuals it is coated with fine and silver white hairs, an almost unmistakable indication of immaturity.

The ornithorhynchus inhabits the still pools of streams where water plants abound, and over whose serene expanse trees bend their shadowing branches. Here it pursues its amphibious existence, hunting the insects which haunt the water, grubbing around the esculent roots of plants, building its home, and eluding pursuit when the natives, who regard it as a delectable morsel, watch patiently for its appearance, spear in hand, upon the banks of the pond. The traveler who is fortunate enough to surprise these animals when actively engaged in their pursuit of food, must remain preternaturally still, if he wishes to enjoy the novel spectacle. If the water is clear and the light favorable, he will see them moving rapidly beneath the water, avidly inspecting the soft banks for beetles; they will rise to the surface every two or more minutes, again disappear to emerge later at a distant point. The slightest movement or noise is instantly detected,



THE ORNITHORHYNCHUS.

bra, called the "odontoid process," remains for a long time disconnected from the vertebra itself, upon which it is normally soldered by a long growth between the surfaces. Some of the cervical ribs in a similar way remain free.

The coracoid bone, which in man is a process only of the scapular or shoulder blade, but in birds is a separate bone, as also in reptiles, and which is a large bone in this animal, articulates with the sternum or breast bone directly. This is a positive amphibian and avian feature. There is an ossification in front of this bone, called the *epicoracoid*, which resembles a similar portion of the reptilian frame. In these

and the shy, strange animal is put to flight, and the charmed spectator must endure a prolonged watch before it reappears.

The nest of the ornithorhynchus is located underground, and is placed at the end of a long, underground, devious passageway, which may be, in exceptional cases, 45 feet long, although more usually 10 feet. This avenue of approach is strewn with dry leaves, as is also the kettle-like hole in which it ends. These homes of the ornithorhynchus are entered by two passages, one above and the other below the surface of the water. Almost invariably the nest is

placed beyond danger of the infiltrating waters of the highest tide.

At rest the animal assumes various positions; the two most familiar are shown in the accompanying illustration. It rolls itself up in a ball with its fore feet tucked under its bill, its hind feet pressed tightly over it, and its tail drawn down over all, or else it lies on its back with its four feet stretched upward in languid delight.

The natives aver that the female lays eggs, and that the male inflicts poisonous wounds with its spur, both of which stories, formerly received with credulity, have been abundantly disproved.

The Trade in Modern Antiquities.

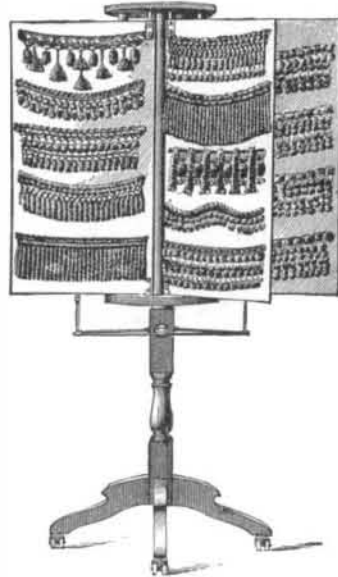
One of the chief delights of Continental travel, as every person of experience will admit, is the unlimited opportunities it affords for buying antiquities. The statuary, the coins, and the pictures that may be purchased in Italy are a score of never failing interest to English travelers and of never failing profit to Italian dealers. Andalusia, again, is a huge curiosity shop. Being once upon a time in Seville, we came across a retired British grocer or tailor, or something of that kind, who had just purchased a Madonna and Child—unhappily, unsigned—which he had picked up for a few pounds in a dingy back street. He was going to send it to the Exhibition of Old Masters, and, if he ever did so, he probably found that it was worth only a pound or thirty shillings at the outside. It is the same, indeed, throughout Spain. The altar cloths, the broken fans, the inlaid tables and cabinets, as resplendent as anything in the convent of the Cartufe at Granada, the wonderful chairs, and the still more extraordinary scraps of ancient lace, upon which all who have ever traveled in Spain have spent much money—these abound from Malaga to Irun, and naturally one is inclined to speculate a little on the odd circumstance that the supply is more abundant than ever, although the demand is fairly brisk. Tangiers is, we should say, a hotbed of modern antiquities, and even Mr. Chamberlain bought some of them when he was over there a year or so ago. He ought to have known something about this class of goods, being a Birmingham man, but the childlike faith of the President of the Board of Trade in all things ancient is notorious. America, oddly enough, has taken to this business of manufacturing the antique Dutch cabinets that, with bronze panels, dingy and marked with the cracks of fictitious centuries, are turned out every day from Chicago furniture stores, and for some purposes they are quite as useful as if they had indeed belonged to some departed burgher in the dead cities of the Zuyder-Zee. New York experts in this sort of forgery make a specialty of Queen Anne chairs and tables, and the imitation is so perfect as to deceive all but those who have studied such things minutely in Europe. The explorer of furniture stores may come upon magnificent specimens of English Gothic chamber pieces or ancient-looking Chippendale and Sheraton chairs,* which might have belonged to Queen Elizabeth but for the fact that they did not. It must be puzzling at first to discover in New York shops stamped leather chairs of the time of Louis Treize, plentifully ornamented with brass nails, whose heads are fully an inch in diameter, and the citizens of that enterprising city are invited to become the happy possessors of as many of these treasures as they like on ridiculously low terms. If, however, the explorer is inquisitive, and the furniture vendors are in a tolerably candid mood, the visitor may be conducted into some back yard where these gems of high art are produced. A Queen Anne's chair just made can, for instance, be supplied with worm holes by the simple process of tilting it bottom side up and firing a charge of pigeon shot into the bottom and front of the seat. Old armor, too, is a good line in this business, the drawings required for the purpose being made from the collection in the Grand Opera House, in Paris. It is said that Birmingham knows something about this branch of the trade, and that helmets, shields, casques, breast plates, and complete suits of mail are regularly manufactured for the gratification of credulous oil speculators and retired pill manufacturers. If a man starts a lot of ancestors he likes to have dummies of them in his hall rigged in their mediæval ironmongery. If Birmingham did not gratify him, Germany would. It is astonishing how many tons of antiquities are annually sold along the Rhine, and it is even asserted that in Castle Colburg, where Martin Luther threw his inkstand at the devil—and unhappily, missed him—the original splash was cut up and sold long ago; but that, as the timber is massive, the place is carefully reinked every night for the purposes of sale next day. We cannot say how much truth or falsehood there may be in this particular story. There might have been some excitement in seeing the original transaction if both the distinguished parties to it were present. There can be none in gazing on a patch of ink. The trade in modern antiquities, however, is a curious reality, as real as the sale of old clothes or tombstones. It is a fact calculated to weaken one's faith in life.—*The British Trade Journal.*

THE *American Journal of Railway Appliances* says there is money for some one who will devise a practical skid for freight cars; one that is part and parcel of the car is necessary, so that it may not be detached except for repairs, and there should be one to each door. It is not possible to convert a portion of each door to this purpose, the editor adds.

* For examples of both the Chippendale and Sheraton styles of furniture see *SCIENTIFIC AMERICAN SUPPLEMENT*, Nos. 389 and 391.

IMPROVED ROTATING SAMPLE STAND.

The engraving represents an invention recently patented by Mr. C. A. Schmidt, of 449 and 451 West Fourteenth Street, New York city, which provides a simple and convenient means for effectively displaying samples of fringes and other goods. The rotary sample stand is constructed with an upright standard, in the upper end of which is a socket, in which revolves a pivot attached to the under side of the upper disk. Near the base of the standard is a second disk, rigidly attached to the upper one, and between the two are hinged skeleton wings, upon which are arranged samples of the goods to be shown. As it revolves, the



outer edges of the wings come in contact with a spring attached to a stationary support, each wing being detained as long as the salesman may desire in order that the samples may be inspected.

By the use of this stand the salesman is permitted to display goods which have been previously arranged harmoniously and in order, thus presenting the most pleasing appearance. Any wing can be selected and brought forward instantly, the construction enabling them to be turned equally well either backward or forward. The time of the salesman and customer is saved, as a large and varied stock can be quickly shown. Since goods are not removed from the shelves until sold, the damaging effects resulting from repeated handling and lying about on the counter are obviated.

IMPROVED PAIL.

To the upper edge of the body of the pail is seamed the outer edge of an inwardly projecting rim, in the under side of which, near its inner edge, is formed an annular recess to receive an iron ring. The edge of the rim is spun down into a rabbet in the ring, so as to leave the mouth of the ves-

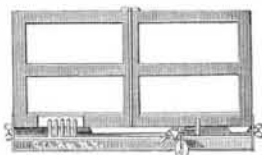


sel neat and smooth. With this construction the annular top of the vessel is strengthened so that it will not be liable to be bent by an accidental blow or by pressure. The cover of the pail is made of such a size that its edge will overlap the inner edge of the rim. An annular plate of rubber or other suitable material, held to the under side of the cover by a flange, serves as a packing between the cover and rim. To the center of the cover is secured the middle part of a spring rod, A, which is made of such a length that its ends will extend a little beyond the ears to which the bail is hinged. In the opposite side edges of the ears are formed recesses to receive the ends of the rods. The cover is thus held securely in place by the elasticity of the rod, and the escape of unpleasant odors is prevented.

This invention has been patented by Mr. Charles H. Paulus, of Irvington, N. J.

IMPROVED MUSIC LEAF TURNER.

Glued to the bottom of the rack is a narrow wooden lath which raises the book so that the pages in turning will



clear the strip formed on organs and pianos, and which prevents the trigger from striking the piano. In a groove in the center piece of the rack are placed wire arms, secured in such a way as to cause their elasticity to incline to the left when they are bent over to the right. On the ends of the wires are metal clamps which grasp the sheets of music.

On grasping a page the wire is laid over to the right, and passed down a slot in an upright at the end of a plate from which its escape is prevented by a trigger. Each wire with its page is similarly treated. The wire arms are of unequal lengths.

Upon the trigger being moved downward, it allows the escape of the upper arm, which then turns the sheet attached to it. The surface of the trigger can be increased, so that the performer, by blowing upon it, can cause it to descend, thereby releasing the upper wire with its page. He is thus enabled to turn the pages of the music before him successively without removing his fingers from the keyboard. That end of the plate upon which the upright is secured can be raised or lowered in order to adjust the clamps to any required height to reach the pages of thick books without bending the wire arms.

Further information concerning this convenient device may be obtained from the manufacturers, Messrs. Wittman and Wimmer, of St. Mary's, Pa.

Rainbows.

Professor Tyndall lately delivered a lecture on rainbows before a crowded audience at the Royal Institution of Great Britain. The lecturer commenced by saying that the earliest historical record of the rainbow was that known to all present—"I do set my bow in the cloud, and it shall be for a token of a covenant between me and the earth." The sublime conception of the theologian exceeded that desire for exact knowledge which was characteristic of modern science. Whatever the ultimate cause of a rainbow might have been, the proximate cause was physical, and the aim of science was to refer a rainbow to its physical principles. After referring to the labors of Kepler and Willebrord Snell in investigating the phenomenon of the rainbow, Professor Tyndall said the explanation of the rainbow was due to Descartes. Descartes looked at the drops of rain, he pictured one a liquid sphere falling in the air, he pictured the rays of the sun falling upon a liquid sphere, he saw that certain portions of the light would be refracted, would be driven to the other side of the drop, back again, and would be again refracted on their emergence from the drop. He took a pen in his hand and calculated the entire course of the rays through the drop and their direction after their emergence from the drop. He found that the vast body of the rays after quitting the drop diverged at one particular angle; they came out as a parallel sheaf. There was a certain form of emotion called intellectual pleasure. It might be caused by poetry, literature, nature, or art, but he (Professor Tyndall) doubted whether there was a pleasure of the intellect more pure and concentrated than that of a scientific man, who, looking at a difficulty that had challenged the human mind for ages, saw that difficulty melt before his eyes and recrystallize as an illustration of a law of nature. Such pleasure, he thought, must have been that of Descartes, when he succeeded in uncovering the laws which ruled the appearance of the most brilliant meteor in nature. The lecturer referred to the experiments and conclusions of Descartes, Newton, Young, Miller, and Airy, and by means of diagrams explained the manner in which the rays of light were refracted in the rain drop. He also, by means of a shower of the fine spray of filtered water thrown by a minutely punctured jet suspended from the ceiling, caused a rainbow to appear in the room. The lecturer also described the appearance and cause of a very rare phenomenon known as the white rainbow, which was observed by him on Christmas day, and concluded his experiments by mixing the spray of some high flashing paraffin with that of some water, which, when illuminated with a strong ray of light, exhibited to the spectator two bows, the ordinary water bow surrounding the more luminous and more concentrated bow due to the paraffin oil.

The Dust Cloud from Krakatoa.

With reference to the Krakatoa eruption, Prof. Alph. Milne-Edwards read at the Paris Academy of Sciences, on January 28, a letter from a correspondent in Réunion, in which it is stated that the intensity of the sky-tints was always greatest where the showers of volcanic ashes had been observed. Thus the path of the volcanic cloud can be traced step by step, and its trajectory found to be that of an ordinary cyclone. M. Wolf showed how a study of the curves registered by the barometer establishes two atmospheric waves starting at the same time from Krakatoa, one toward the east and the other toward the west; the former to reach us had to traverse 11,500 kilometers, and the latter 13,500. M. Wolf showed that the rate of progress was that of sound, and on the basis of this and the distances, he found the eruption to have taken place on August 27, at 11 h. 43 m. A. M.

To Protect the Alligators.

The trunk, satchel, and pocket book manufacturers of New York city and Newark, N. J., have resolved that they will hereafter refuse to buy any skins that will not measure five feet in length. They have published notice to this effect to prevent the indiscriminate slaughter of small alligators by the hunters before the skins are large enough to become of much value. We do not suppose, however, that this resolution will have any effect in limiting the amount of imitation alligator leather made, or determining to what age the sheep shall live whose pelts supply so much of it.