

TEETH, CLAWS, TONGUE, AND WHISKERS.

We have grouped together in the accompanying engravings (from Wood's "Natural History") some of the characteristic features of the lion, the object being to show the wonderful mechanism with which Nature has so richly endowed that animal to enable it to carry out the instincts which are implanted in its nature. The lion belongs to the *Felide*, or cat tribe, and the characteristics here noted are as true for the demure tabby which placidly purrs on the hearth, as for the fierce king of the African forest; while they are brought into play as actively and as completely in the capture and devouring of a mouse by the one as in the taking of an antelope by the other.

It is not generally realized that the whiskers of the cat tribe are the means of almost another sense. Each whisker hair is, in fact, an organ having an exquisite sense of touch, and is in connection with a set of large nerves which convey to the brain a perception of the slightest impact. In Fig. 4 is given a magnified representation of a single hair bulb of one of the whiskers, together with the nerves by means of which the hair is converted into a tactile organ. If the extremity of the hair is touched a pressure is instantly made on the nerves at its root. By means of these delicate feelers, the animals are able to guide themselves through the thickets, and to escape the risk of alarming their prey by too rude a contact with the branches.

When a lion kills an eland, and does not happen to be very ravenously hungry, he feeds daintily on the heart and other viscera, rarely touching the remainder of the flesh. In so doing he rips open the abdomen with his powerful claws, thus bringing to play a second time the talons which are so curiously adapted for seizing and holding the victim. The mechanism of the cat's claw is shown in Fig. 2. When the animal is at rest, the upper tendons draw the claw backward, so that it is lifted entirely from the ground, and the weight of the body rests only on the soft pads which stud the under surface of the foot. But when the creature becomes excited, and thrusts out its paw for the purpose of striking a blow or clutching at its prey, the upper tendons become relaxed, while the lower tendons are tightened, and the claw is thrown forward, ready for use.

Another curious structure common to all feline animals is found in the tongue. The finger passed over the tongue of a cat will show at once that it is dry and rough, and thus in strong contrast with the wet, smooth tongue of the dog. Examination of the surface with a magnifying glass will show, however, that the entire surface of the tongue is covered with innumerable conical projections, which are so curved that their points lie towards the throat. On the central line of the tongue these projections are longer than at the side. Their chief if not their only use is to aid the cat in stripping the flesh from the bones of the animal which it has killed, and so to prevent the least waste of nutriment, a curious example of Nature's economy. So strongly made are these projections that the constant licking of a cat's tongue will remove the lining tissues from a delicate skin, while the tongue of the lion, Fig. 3, can rapidly cause the outflow of blood.

The teeth of the exclusively carnivorous animals are always of a form which permits them to seize and tear their prey, but does not give them the power of masticating their food after the manner of the vegetable feeders. None of the teeth are furnished with the flat surfaces which are ne-

cessary for grinding the substances which may be placed between them; and this inability does not lie only in the teeth, but extends to the very framework of the jaws. As may be seen on reference to Fig. 1, the lower jaw is so largely developed at its base, and fits so deeply into its socket, that lateral motion is impossible. In order to give a more perfect view of the lower jawbone, the bone immediately above it has been removed and presents only its cut surface. This part of the structure is scientifically known as "malar," or cheek bone, and forms an arch, which has been termed the "zygomatic" arch. In the carnivorous, and more especially in the feline animals, this bone is extremely large in proportion, and is increased in strength by the very decided curve. The great size as well as the peculiar form of this bone are required for the purpose of affording protection to

roadway, with pathways for foot passengers on either side. The engraving (which we copy from the London *Graphic*) shows a curious blending of the architecture of the Ptolemies with the more practical, if less ornamental, system of construction adopted by nineteenth century engineers.

Foreign Industrial Notes.

Tanned Fish Skins.—At the maritime exposition held at the Westminster Aquarium there were exhibited the tanned skins of various fishes, susceptible of a multitude of uses. There were, especially, skins of eels prepared for harness, skins of flat fish for glove making, shark skins more than nine feet long by three wide, yielding a superb leather. The same exhibitor sent from Christiania bands of whale skin fifty-eight feet long, designed for making driving belts for machinery.

A New Barometer.—In the *Bulletin Français*, M. De Parville describes the mode of construction of a new form of barometer, which is not claimed as an instrument of precision, but to be cheap, simple, and tolerably accurate.

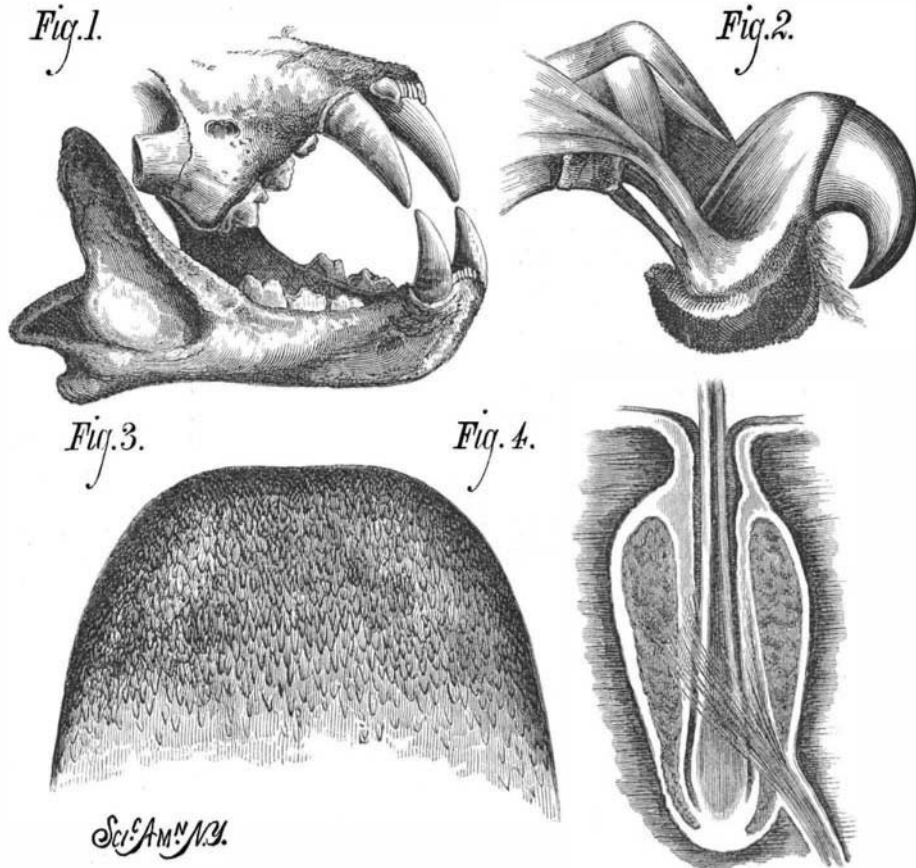
A medium sized bottle is tightly stopped with a cork traversed by a quill tube. This tube should be about one tenth of an inch in diameter and 19 or 20 inches long, and should extend into the bottle for two thirds of its length. The joints must be made thoroughly air-tight with wax. Then slightly warm the bottle to dilate the air, and dip the extremity of the tube under water while cooling. In this manner fill the bottle so that the surface of the water just touches the inner end of the tube, then add a little more until it stands in the tube at some easily remembered level. This is the whole apparatus. When the weather threatens rain the surface of the column of water will sink, and *vice versa*. Variations in temperature also cause changes in the length of the column, but a little practice will enable the observer to allow for these, or if the instrument be kept in a cellar or in any other place of even temperature they will not occur.

New Process of Tanning.—An Italian chemist, M. Paesi, of Mortara, has discovered a new process of tanning, much more rapid than the old. It consists in letting the skins macerate in a bath of perchloride of iron and marine salt, in solution in water. The total operation lasts only from

four to six months, of which only the half is for tanning proper. Moreover, the perchloride of iron being a powerful disinfectant, the new method insures the wholesomeness of an industry which has hitherto been very nauseous. The French *Journal d'Hygiène* has called particular attention to this process, and the *Conseil d'Hygiène* of the Puy de Dôme has undertaken new experiments on the subject, with a view of remedying in certain quarters of Clermont and Ferrand the infection arising from the cause referred to.

Improved Process of Engraving on Glass.—The action of hydrofluoric acid on glass being very rapid, and its use being attended with great danger, the *Jeweler* recommends the following as a safer method of engraving:

A coat of engraving varnish is put on the glass with a pencil. The varnish, which goes by the name of "Florence," is one of the best. It is heated in a varnish pot, and linseed oil and mastic in drops are added in equal portions. Mix and pass through a cloth. Keep in closely stoppered bottles. The varnish is spread so as to leave the parts to be engraved uncovered, that the drawings may be traced with a metallic point. A paste of fluete of lime in powder and concentrated sulphuric acid is put on in a thin layer. This paste acts

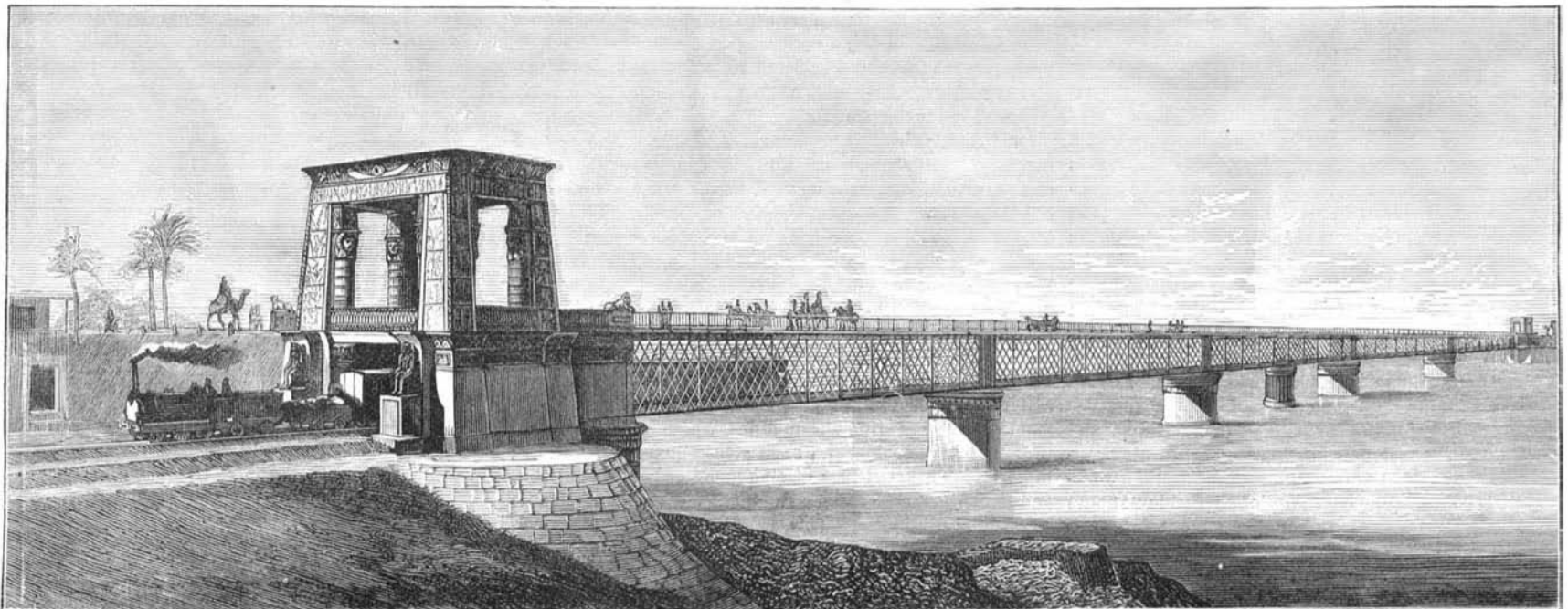


THE LION'S DESTRUCTIVE APPARATUS.

the enormously powerful muscles, by means of which these animals are enabled to tear their food, and also for the attachment of certain jaw moving muscles. There is an upward as well as an outward curve in the malar bone, which gives strength precisely where it is most required.

A NILE BRIDGE.

The innovations which modern progress is making in Egypt could hardly be better illustrated than by the accompanying engraving of a projected bridge which is to cross the Nile at Mansurah. It is to be constructed from the designs of Signor Alfredo Cottran, a well known engineer of Naples and managing director of a large engineering establishment at Castellamare, which has erected more than one thousand metallic bridges in Italy, Spain, and Turkey. It is to be built partly of stone and partly of iron, and the construction will be a combination of the suspension principle with straight girders, a method frequently adopted in this country for large spans. The two main piers are constructed of wrought iron, cast iron, and masonry, and the superstructure will be composed of two stages superimposed, the lower being intended for a railway and the upper for an ordinary



PROPOSED IRON RAILWAY BRIDGE ACROSS THE NILE.