

**IMPROVED WAGON JACK.**

We give herewith an engraving of a very simple and inexpensive wagon jack, which has lately been patented and is being manufactured and introduced by Messrs. R. S. Hartzell & Co., No. 235 South Third street, Philadelphia, Pa. The cut shows the jack with one side removed to show the internal construction. The lifting device consists of three parts: the lever, A, the intermediate piece, B, and the follower, C. These parts are arranged in relation to each other, so that when the lever, A, is pressed down the follower, C, rises, and when in its highest position is locked

**NEW WAGON JACK.**

automatically by the short arm of the lever, A, and the intermediate piece, B, being then placed so as to take the full weight of the load on their pivots.

The standard, base, follower, C, and lever, A, are made of wood. The intermediate piece, B, and the shoes at the ends of the follower and at the end of the lever, A, are made of cast iron, and the cover which incloses the working parts is made of rolled iron. The jack is substantial, serviceable, and cheap.

Any further information in regard to this useful invention may be obtained from the manufacturers, whose address is given above.

**NEW AUTOMATIC CLAMPING AND PNEUMATIC PAPER CUTTING MACHINE.**

Our engraving shows an improved paper cutting machine, invented by H. P. Feister, M.E., and manufactured by Rex & Bockius, No. 614 Filbert street, Philadelphia, Pa.

This machine in its construction is a new departure, and differs from former paper cutting machines chiefly in the use of compressed air to operate the automatic clamps for holding the paper while being cut, the compressed air being so applied that the same pressure which clamps the paper, also acts as a power, in an equal ratio, to help in the process of cutting, thereby relieving the gearing of a portion of the strain while making the cut, and avoiding the breaking of gear teeth so common to other machines.

Persons familiar with this class of machines will readily understand its working from the engraving, as it does not differ essentially from other machines of the kind, except in the application of compressed air to clamp the paper, and at the same time assist in cutting. It consists simply of a driving shaft, with a pinion and clutch, an air pump, and a large gear having a crank to impart an upward and downward motion to the table, the motion of the table also giving a lateral or draw cut to the knife bar as it rises upward in the operation of cutting. Secured to the table is an arched or curved yoke, fitted with pistons which have an upward and downward movement in cylinders secured to the paper clamp on its rear side, the clamp resting on pins slightly below the cutting edge of the knife. The knife is arranged to traverse to the right and left between rollers in the housings, and it has neither an upward nor downward movement.

In working the machine the operator pulls toward him the inclined lever, seen at the side of the machine, which throws

in gear a clutch, starting in motion the large crank gear, which imparts an upward motion to the table, carrying with it the paper against the clamp, the clamp being held down firmly against its seat by the air pressure between the pistons and bottoms of the two air cylinders, the same movement of the lever which started the clutch having at the same time admitted air through a suitable valve to the two cylinders and underneath their pistons, and also at the same time to the cylinder on top of the machine, all the pressure entering the upper cylinder assisting in pulling upward on the table, by means of the connecting rod attached to the tongue on the yoke, and helping the gearing to force the paper against the knife, thus aiding in cutting the paper, while, at the same time, the two cylinders are holding it firmly in position to be cut. To make the process of clamping still more plain, it may be stated that the air clamp, being held down firmly against its seat, the upward movement of the table carries the paper against the clamp, it of course cannot move the clamp until the paper is pressed upward firmly against the clamp, after which the clamp, cylinders, yoke and table all move upward together until the end of the stroke is reached and the cut made, when they again move downward together until the lower end of the stroke is reached, when the clutch is automatically unshipped and the valve opened, releasing the air from their respective cylinders and loosening the paper from the clamp. The manufacturers claim that this machine will do twice as much work as other paper cutting machines with the same power applied.

**What is Space?**

"Space is a real, objective, immaterial, extended, continuous, infinite, immutable, eternal, and absolute whole of capacity to receive extended substance, existing in trine extension of infinite length, infinite breadth, and infinite depth, which is ideally divisible in each dimension, into finite wholes of locality, all of possible forms and sizes, possessing the relations of similarity, difference, ratio, direction, distance, contiguity, and conjunctibility; and comprising units of trine extension, surfaces, lines, and points, each of which is infinitely divisible; trine extension into surfaces, surface into lines, lines into points, and points into infinitesimal fractions of position, which compose the infinitude of space, in a number which is formed by the involution of relatively infinite number to the seventh power."

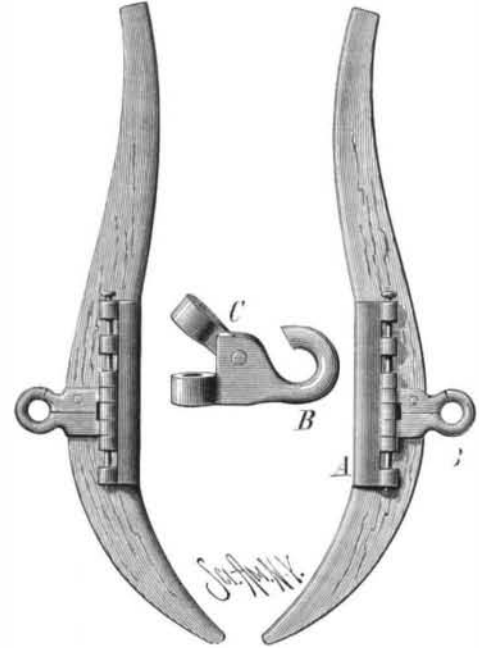
This simple and lucid description is furnished by Rev. H. L. Gear, in an article on "The Concept of Space," in the Cincinnati Baptist Review. We trust that all our readers will be careful to bear it in mind always when they have to think of that fundamental concept. No end of intellectual

difficulties arise from a neglect to form and hold just views of such important elements of right thinking.

**IMPROVED HAME.**

The engraving shows an improved hame lately patented by Mr. James M. Davis, of Peach Orchard, Ark. The invention relates principally to the irons for connecting the traces with the hames, the object being to permit of shifting the pressure on the horse's shoulder when necessary to avoid galling and irritation.

Plates, A, which are fitted to the convex face of the hames, have a series of jaws with recesses between them, and a hole through them to receive a pin which passes through them all. The hook, B, which connects the traces, is fitted to one of the recesses in the plate, A, and

**DAVIS'S IMPROVED HAME.**

is provided with a pivoted part, C, which fits in the adjacent recess and has an extension which meets the end of the hook and forms, when the hook is in place on the hame, a complete eye, from which the trace fastening cannot escape. The hook is thus made perfectly safe, and being entirely closed it is prevented from catching into the harness of another horse.

Should the horse's shoulders become sore the hook, B, may be readily shifted up or down by simply withdrawing the pin and placing the hook in a different position and replacing the pin.

This device is very simple and serves a very useful purpose in adjusting the draught to the best advantage, thus relieving the horse of a great deal of discomfort and in many cases actual suffering.

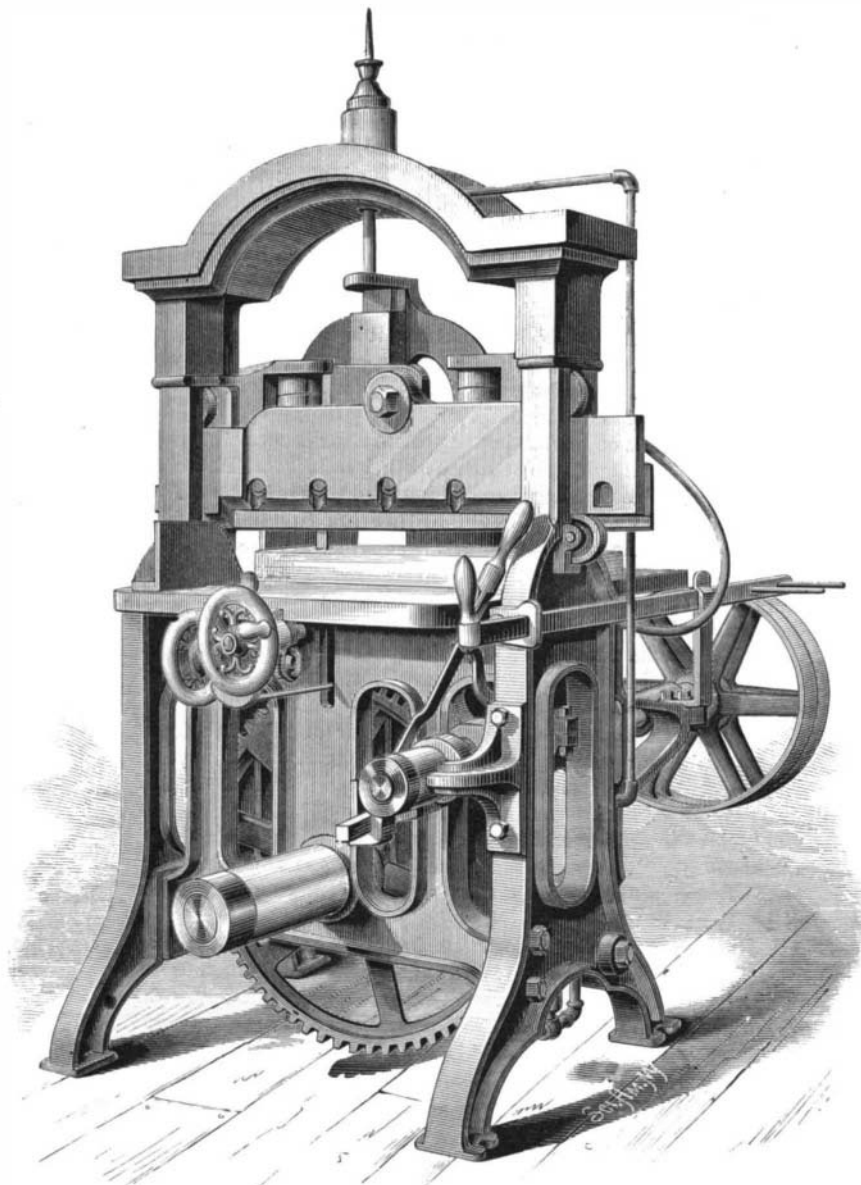
Further particulars may be obtained by addressing the inventor as above.

**MECHANICAL INVENTIONS.**

An improvement in wagon jacks has been patented by Mr. John Charles, of Clear Spring, Md. This invention relates to certain improvements in that class of wagon jacks in which a lever carrying two pawls or gripping jaws is combined with a lifting bar having a double set of ratchet teeth, whereby the oscillation of the lever is made to cause the travel of the lift bar over the main section, to which the lever is pivoted. The improvement consists in pivoting the pawl jaws to the lever in such relation to springs on the main bar that the lifting bar may be made to travel either up or down without change in the adjustment by simply changing the range of oscillation of the lever.

An improved vehicle wheel hub has been patented by Mr. Lindsey Rossiter, of Port Carbon (Bridgeport P. O.), Pa. The object of this invention is to improve the construction of axles, axle boxes, and hubs, so that they may be conveniently oiled, will not leak or waste oil.

A press for bending rims of pianofortes to the shape required, and at the same time veneering them, has been patented by Mr. Frank Denninger, of New York city. This invention consists in a press bed of rectangular form, having combined with it loose presser blocks of the shape to which the rims are to be pressed, and fitted with clamping shackles and screws for compressing and holding the rims which are placed between the blocks in the press. The presser blocks are also fitted with adjustable gauges for retaining the rims in position.

**FEISTER'S AIR-CLAMPING PAPER CUTTING MACHINE.**

Mr. Johannes A. Osenbrück, of Hemelingen, near Bremen, Germany, has patented a new bearing, which is simple in construction, and which can carry great weights without the friction which acts so destructively upon the bearings in use at present and renders them useless. The bearing is provided with one or more disks for distributing the lubricating material; these disks are below the spindle in case the same is vertical, and are rotated by the spindle by means of intermediate gearing in such a manner that the disks rotate in the same direction as the spindle, but their rapidity decreases in arithmetical progression from the end of the spindle.

One of the principal defects in an ordinary brake is that the shoe is fastened to the clog by bolts or keys that in a short time become loose, thereby causing a disagreeable rattling and increased expense and labor for repair, and the clog, in time, also works loose on the brake bar, because of the shrinking of the latter; and in ordinary brakes the brake guide ordinarily consists of a straight piece of iron fastened to the end of a brake bar itself, and consequently the guide does not always operate effectively. Messrs. Charles F. Wohlfarth and Clovis W. Wakefield, of Norwich, Conn., have patented a car brake intended to obviate these difficulties.

#### THE BERLIN FISHERIES EXHIBITION.

BY FREDERIC A. LUCAS.

The Fisheries Exhibition, which opened at Berlin on the 20th of April, is very wide in its scope, including, besides

a half long, and pointing backwards, so that whatever the animal starts to swallow must go down. The great size of this turtle—it weighs from 300 to 1,500 pounds—would render it a prize indeed were it not that the flesh is poisonous, and causes severe illness to any one rash enough to partake of it. Its home is the tropical Atlantic and the Mediterranean; but it is probably a mere straggler in the latter sea.

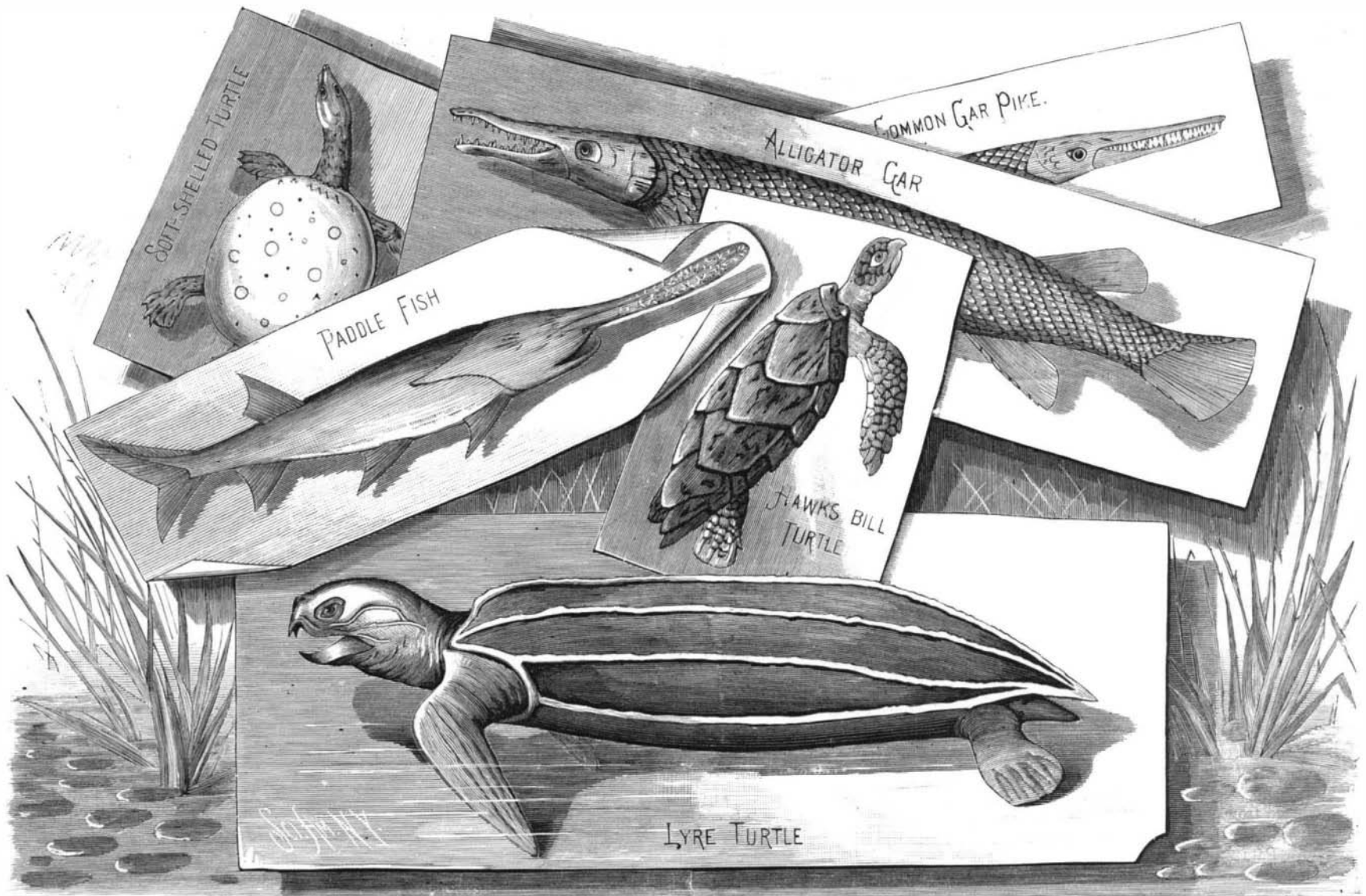
The beautifully mottled plates which cover the back of the hawk's-bill turtle (*Eretmochelys imbricata*) form the well known "tortoise shell" of commerce, and cause it to be much sought after. Thus its very means of protection becomes its greatest source of danger. The plates, when softened by heat, can be united in a homogeneous mass and worked to any required shape. The peculiar color and markings are now so skillfully imitated in horn that it is difficult even for an expert to recognize the difference; but as there will always be plenty of customers who want "the real article," it is not probable that the turtle will be any the less hunted. A great proportion of the sea turtles are captured by spearing them while asleep with a round pointed spear. This is technically called "pegging."

The soft-shelled turtle, of which we have several species, inhabits our Southern and Western streams. The central part of the carapace, or covering of the back, is of bone, but is covered with a smooth skin, and widely bordered by a thick but pliable leathery margin, under which all the extremities can be drawn. These turtles have extremely long necks, are remarkably quick and vigorous in their movements, and exhibit great ferocity when captured. Still

Mississippi. The Rio Grande is perhaps its headquarters, although it would seem on some accounts an ill-chosen habitation. Running up into the warm shallows when the river is high, the rapid fall of the waters entraps numbers of them in small pools. Then begins a veritable struggle for existence; the large fish prey upon the smaller ones, and in their turn fall victims to starvation or are killed by the evaporation of the little pond. This fish attains a length of four or five feet, sometimes six, and very rarely eight feet; but this last is exceptional. The common gar pike (*L. osseus*) is a much smaller and more slender fish, not often exceeding three and a half feet in length, and quite abundant in the great lakes and Western and Southwestern streams.

#### NATURAL HISTORY NOTES.

*Origin of Flowers through Selection by Insects*—Dr. Herman Mueller has, not long since, published a work in which he seeks to explain the existing variations in the forms of flowers on the principle of selection. His supposition is that insects of different tastes bred peculiar flowers, just as men breed peculiar races of cattle. Carrion-loving insects bred their kind of flowers, and long-tongued insects the tubular kinds, and many other classes of insects have, each class, bred the flowers they love best. Dr. Mueller has a note in *Nature*, of July 8, in which he points out that *Saxifraga umbrosa* has been adorned with brilliant colors through selection by dipterous insects of the family Syrphidæ. He says: Among diptera the most assiduous visitors of flowers are certain Syrphidæ, which, elegantly colored themselves,



SPECIMENS AT THE BERLIN FISHERIES EXHIBITION.

fishes and the apparatus used in their capture, and examples of the varied articles of food, oil, etc., prepared from them, almost all aquatic animals, such as seals, whales, turtles, and batrachians, down to shell fish and sea urchins. The United States National Museum, in conjunction with the Fish Commission, secured a space of 500 square meters, and sent a large and interesting collection, which was arranged under the supervision of Mr. G. Brown Goode. Among private individuals, Prof. H. A. Ward, of Rochester, sent a very creditable series of specimens, a few of which are shown on this page. Noteworthy among these is the lyre turtle (*Sphargis coriacea*), the largest of existing species, and *par excellence* a sea turtle. Until quite recently specimens of this were extremely rare; but during the past few years at least six have been taken between Newport and Cape Cod, having followed northward the warm waters of the Gulf Stream. Instead of the usual bony shield, this turtle is covered with small plates about the size of a ten cent piece, embedded in a thick leathery skin, from whence comes its popular appellation of leather turtle. The name of lyre turtle was bestowed upon it from its fancied resemblance to that musical instrument, the five dorsal ridges representing the strings. The paddles are nail-less and covered with black skin a little suggestive of India-rubber. The animal figured was about seven feet long, and as much in width from tip to tip of the front flippers. The throat is lined with sharply-tipped spines, about an inch and

their food seems to consist chiefly of insects and small shells.

The paddle-fish (*Polyodon folium*) is a curious resident of the Ohio and its tributaries. It is said, and the statement seems plausible, to stir up the bottom for insects and crayfish, and pick them up in its capacious mouth. As it is also accused of a predilection for offal it is not, used as food, although the flesh looks firm and palatable. Still its personal appearance is somewhat against it, for many people have strong prejudices against anything that seems at all uncanny. Some refuse to eat eels because "they look just like snakes," and the skate is held in abhorrence simply because it isn't a pretty fish.

The gars, one might almost say, are living fossils, for they are among the few existing representatives of the hosts of mail-clad fishes that swam the Devonian and Oolitic seas and carried terror and destruction among their weaker brethren. Compactly built, clad in silvery armor, and equipped with a goodly supply of wicked-looking teeth, they are true fresh water tyrants. Numbers of them are taken in seines, to the disgust of fishermen whose nets are torn by their teeth. The common gar is found west of the Hudson, and ranges from the great lakes to Florida and in the Mississippi and its tributaries. The alligator gar (*Lepisosteus platystomus*), so called from his short, broad muzzle, is a more Southern fish, and dwells from Florida to Texas, running some distance up the

are fond of splendid flower colors, and, before eating pollen or sucking nectar, like to stop awhile, hovering free in the air, in front of their favorites, apparently fascinated, or at least delighted, by the brilliancy of their colors. Thus, I have repeatedly observed *Syrphus balteatus* hovering before the flowers of *Verbascum nigrum*, and often before *Melanostoma mellina*; *Ascia podagrica* before *Veronica chamaedrys*; in the Alps, the lank *Sphegina clunipes* before *Saxifraga rotundifolia*; and, in my garden, *Ascia podagrica* before *Saxifraga umbrosa*. Of *Verbascum nigrum*, the main fertilizers are humble bees, diptera co operating only in a subordinate degree; in the case of the three other species, on the contrary, the above named Syrphidæ are such frequent visitors and cross-fertilizers that we may safely conclude that it is by their selection of elegantly colored varieties that these flowers have acquired their beautiful peculiarity. Hence, in order to estimate the color sense of these Syrphidæ, it is worth while to consider what color combinations they have been able to produce by their selection. *Saxifraga umbrosa* being, as far as hitherto known, their finest masterpiece, we may, in the first place, look at the variegated decoration of this species. Its snow-white petals are adorned with colored spots, which, in size and intensity of light, gradually decrease from the base of the petals toward their extremity. Indeed, nearest to their base, within the first third of their length, there is a large irregular spot of an intense yellow;