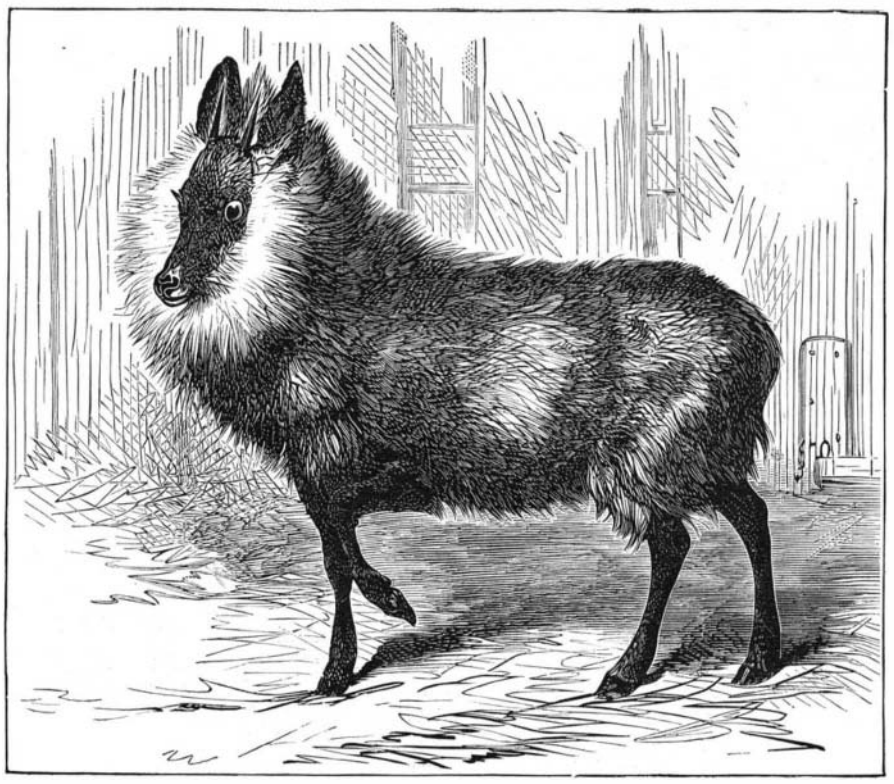
THE JAPANESE GOAT ANTELOPE.

Some interesting additions have recently been made to the series of ruminants in the Zoological Gardens, London. There is a specimen of the Japanese antelope, of which we give an illustration. This animal is new to the society's collection, nor has it previously been exhibited in any of the continental gardens, so far as we know.

The Japanese goat antelope (*Capricornus crispus*) is, as its name imports, a native of the Japanese empire, where it is said to be very rare, being only found in the higher mountains of the interior of the islands of Niphon and Sikok. It was first described by Siebold in his well known work "The Fauna Japonica," from two examples in the Leyden Museum. Siebold tells us that its Japanese native name is "nik," but he gives us scarcely any other details respecting this animal. The engraving represents a young male, with his horns growing.



THE JAPANESE GOAT ANTELOPE.

A New Fish.

Professor Baird has forwarded, through Dr. Tarleton H. Bean, now at Gloucester, to Mr. E. G. Blackford, Commissioner of Fisheries, an entirely new fish, which, aside from representing a novel genus, may have a decided commercial value. The first one seen was caught by Capt. W. H. Kirby, of Gloucester. It represents the new genus *Lopholatilus*, one having the general appearance of *Latilus*, but with the addition of a nuchal crest and labial appendages. It has received the name of leopard fish, on account of its spots. The fish were caught 50 miles south by east of Noman's Land, in 75 fathoms of water, while trying for cod and with cod bait. The fish seemed very abundant. A few weeks ago the presence of these fish was totally unheard of. Dr. Bean writes: "The type is in the National Museum, but now we have eight to bear it company." Examining the fish at Mr. Blackford's, it was found to have some very peculiar traits. What was strange was to see an adipose fin like that on the salmon, only that this fin, instead of being near the tail, was on top of the head. The dorsal extended from about two thirds of the fish to the caudal. Below, under the belly, the fin was continuous. The head had no semblance to a cod. The teeth were fairly well developed and sharp. In color it was yellow, with spots. Those who have eaten the leopard fish declare it to be excellent. The fish was about 28 inches long, and would weigh, perhaps, about the same as a cod of the same size

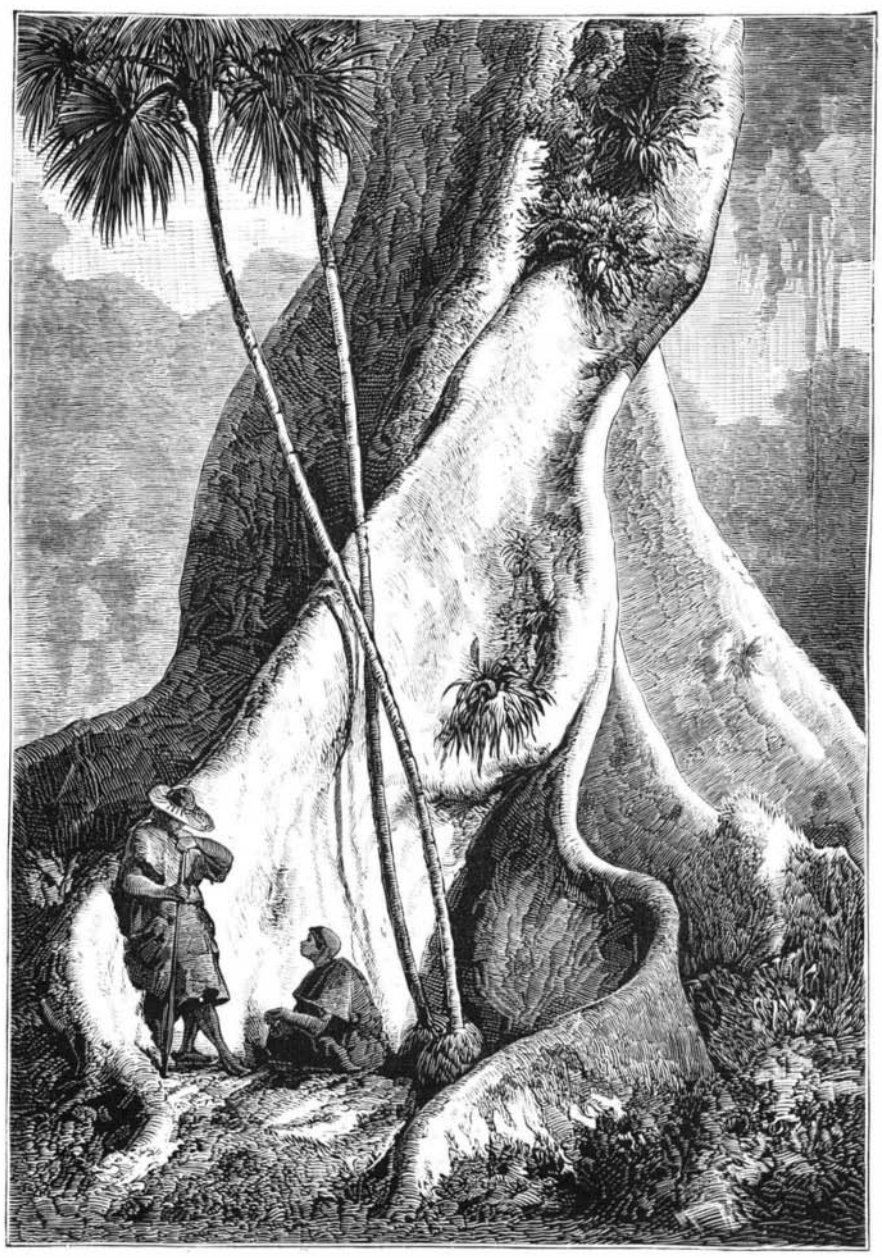
GIANT TREE.

The colossal pao d'arco, or bow wood (*Tecoma speciosa*), and macaranduba (*Mimusops elata*), abound in the virgin forests north of Rio; the timber of both is exceedingly hard and extensively used in carpentry and cabinetmaking. From the latter is extracted, by incision, a whitish, sweet, savory fluid, commonly used while in a liquid state as milk, in tea and coffee; after some hours it coagulates, forming a white elastic mass resembling India-rubber. The bark is very rich in tannin, and is much used in dyeing. The total height of these trees, stem and crown, may be estimated at from 180 to 200 feet; the vast dome of their foliage rises above other forest trees, as does that of a cathedral above other buildings in a city. Logs 100 feet long, squared, from these trees, are not uncommon at the sawmills near Belem. The growth of the buttress-shaped projections around the lower part of the stems, not only of the trees just mentioned, but of all of the larger trees, is a remarkable feature of the forest; the buttresses, generally thin walls of wood, form spacious stall-like compartments, often capable of holding a half dozen persons, and serve as props to the enormous stems.

Economical Use of Coal.

The success of most manufacturing processes depends to a great extent on the economical use of the fuel employed. It is painful to contemplate the enormous waste of fuel which often occurs, and it it is not surprising to find that many minds have been busy in endeavoring to arrange a form of furnace which shall generate and utilize a maximum of heat from a minimum of fuel. Recent inventions, says the *Brewers' Guardian*, seem to indicate that we shall, before long, have practical methods contrived for the conversion of coal into gas before it is used for heating purposes; by taking a given weight of coal and distilling it, and thus separating the solid and gaseous constituents, we undoubtedly effect an economy; the difficulty hitherto has been, and now is, to effect this separation in a practical manner. The very general use of the modern gas engines is evident that coal gas is becoming recognized as an economical fuel; but the man who first invents a practical method of burning coal, so that it is first converted into its solid and gaseous constituents, which are subsequently in the same furnace burnt so as to develop the greatest amount of heat, will realize for himself an enormous pecuniary recompense, and will do a great service to mankind at large.

THE digging of the canal from Cronstadt to St. Petersburg is progressing so rapidly that Admiral Possiett, who directs the work, has assured the Russian government that vessels of light draught will be able to reach the capital by next summer. Its depth will be 20 feet.



ROOT OF A GIANT TREE.

NATURAL HISTORY NOTES.

The Annual Rings of Trees.—Does a single zone of wood invariably indicate the entire annual growth of a tree? This is a question that has not as yet been satisfactorily answered. Generally speaking the number of concentric rings present in a cross section of a trunk will afford a tolerably correct idea of the age of that particular part of the trunk from which the section is taken. To obtain as nearly as possible the age of a tree the section must, of course, be taken from the base of the trunk. It is not easy, however, to prove whether two or more rings are sometimes formed in the trunk of a tree in one year, because it would be necessary to know beforehand the exact age of the tree, and cut the tree down to determine the point. Several writers have given it as their opinion that two rings are occasionally formed in one year, caused by an interruption and resumption of growth. Some of them agree that when there are two rings formed in one season they are not so sharply defined as when there is only one in each season. Last season Mr. L. Kny made some observations and experiments in England with a view of obtaining some more satisfactory and positive results than previous writers had placed on record. At the end of June he completely stripped a number of young trees of their leaves, thinking he would be able to determine the point from their autumn shoot; but being in a nursery quarter they made too little growth for the purpose. But nature herself gave him the best opportunity. The caterpillars of *Lymantria dispar* stripped a large number of trees of their foliage about the same time, and many of them made strong autumn shoots, so that Mr. Kny was able to determine that, in some instances at least, a second distinct ring is formed in one summer; and these rings are as sharply defined and as distinct from each other as the autumn growth one year's ring and the spring growth of a succeeding year's ring. On the other hand, he observed a noteworthy difference in the degree of distinctness in different species of trees, and in the same tree at different heights, and even in the same internode. Moreover, there was a difference in the degree of distinctness of the two rings on the upper and under sides of the horizontal branches of the lime (*Tilia parvifolia*). Respecting the degree of distinctness at different heights, it was ascertained in the branches examined that there was a gradual decrease in distinctness from the younger to the older internodes, until all traces of a second ring seem to disappear. But there is this limitation to it: the two rings are not most distinctly separated in the uppermost internode, but in the second or third from the top. These investigations, as far as they go, seem to show that summer interruptions of growth are too brief to affect the whole system of a large tree, consequently the number of concentric rings of wood in the trunk of a tree represent very closely the actual age of the tree.

The Consciousness of Pain in Inferior Animals.—Professor T. Rymer Jones, in writing of crustaceans, takes occasion to make the following remarks in regard to the susceptibility to pain of these and other animals. Is it really true in philosophy, says he, as it has become a standing axiom in poetry, that—

> "The poor beetle, that we tread upon,
> In corporal sufferance feels a pangas great
> As when a giant dies"?

This is a question upon which modern discoveries in science entitle us to offer an opinion, and the result of the investigation would seem to afford more enlarged views relative to the beneficence displayed in the construction of animals than the assertion of the poet would lead us to anticipate.

Pain, "Nature's kind harbinger of mischief," is only inflicted for wise and important purposes—either to give warning of the existence of disease, or as a powerful stimulus prompting to escape from danger. Acute perceptions of pain could scarcely, therefore, be supposed to exist in animals deprived of all power of remedying the one or of avoiding the other. In man the power of feeling pain is indubitably placed exclusively in the brain; and if communication be cut off between this organ and any part of the body, pain is no longer felt, whatever mutilations may be inflicted. The *medulla spinalis*, which corresponds to the ventral chain of ganglia in articulated animals, can perceive ex-

ternal impressions and originate motions, but not feel pain; hence we may justly conclude that in the articulates likewise, the supra-œsophageal ganglia, the representatives of the brain, and the sole correspondents with the instruments of the higher senses, are alone capable of appreciating sensations of a painful character. Thus, then, we arrive at a very important conclusion, namely, that the perception of pain depends upon the development of the encephalic masses; and, consequently, that as this part of the nervous system becomes more perfect, the power of feeling painful impressions increases in the same ratio; or, in other words, that inasmuch as the strength, activity, and intelligence of an animal, by which it can escape from pain, depends upon the perfection of the brain, so does the perception of torture depend upon the condition of the same organ. How far the feeling of pain is acutely developed in the animals we are now considering (articulates) is deducible from every day observation. The fly seized by the leg will leave its limb behind and alight with apparent unconcern to regale upon the nearest sweets within its reach; the caterpillar enjoys, to all appearance, a tranquil existence while the larvæ of the *ichneumon*, hatched in its body, devour its very viscera; and, in the crustacea, of so little importance is the loss of a leg, that the lobster will throw off its claws if alarmed by the report of a cannon; and, again, should the claw of a lobster be accidentally damaged by accidents, to which creatures incased in such brittle armor must be perpetually exposed, the animal at once breaks off the injured member at a particular part, namely, at a point in the second piece from the body; this operation seems to produce no pain.

How Caterpillars are Protected.—Mr. A. R. Wallace, in "Science for All," says that it is among caterpillars that protective coloring is most general and conspicuous. An immense number of these creatures are green, corresponding with the tints of the leaves on which they feed, or are brown when they rest on bark or twigs; while a large number of the larvæ of the geometridæ, or "loopers," have the habit of sticking themselves out rigidly, like sticks, which they exactly resemble in shape as well as color. Every one knows, however, that there are a number of very brightly colored caterpillars, and it may be asked how these are protected, or why the others need protection if these can do without it. The answer to this question is most instructive, and affords the most conclusive proof that various examples of protective tints in nature really have the effect we impute to them. It has been found by repeated observation and experiment that every green and brown caterpillar, without exception, is greedily eaten by birds and even by frogs, lizards, and spiders, and that they endeavor to conceal themselves from these numerous enemies by feeding usually at night, while during the day they remain motionless upon leaves, twigs, or bark of the same color as themselves. The brightly colored caterpillars, on the other hand, were found to be universally rejected by birds when offered to them, and even by lizards, frogs, and spiders. None of these would touch the common spotted caterpillar of the magpie moth (*Abraxas grossulariata*), nor those of the *Cucullia verbasci*, *Callimorpha iacobeæ*, or the *Anthrocera filipendulæ*. Sometimes the caterpillars were seized in the mouth, but always dropped again, as if in disgust at their taste. The same rule was found to apply to all hairy or spring caterpillars; and, what is very interesting, the habits of these creatures are correspondingly different from those of the green and brown eatable species. They all feed during the day; they do not conceal themselves, but feed openly, as if courting observation and secure in the knowledge of their safety from all enemies.

Under the caption of "A Poisonous Caterpillar," *New Remedies* quotes from the *Journal of the Royal Microscopical Society* an account of a poisonous caterpillar lately discovered in Brazil, and the effects of which, when the spines with which it is covered come in contact with the skin, are described as very severe, and consist of redness and burning of the part, and acute pain, extending, when the hand is the part affected, quite to the armpit. The editor of *New Remedies* remarks that the larva of the Io moth (*Hypercheiria Io*) of this country is capable of causing symptoms quite similar to those above described. To this we may add that the caterpillars of many of our other moths are equally poisonous to man, and it is to the presence of these irritating bristles, undoubtedly, that they seem to be distasteful to birds and other enemies, as remarked by Wallace in the above note. Among the poisonous kinds that occur to us at present, we may mention the "saddle-back caterpillar" (*Empretia stimulea*), which causes the hand that has been touched by it to swell up, with watery pustules, accompanied by intolerable itching; the caterpillar of the common vanessa butterfly (*Vanessa antiopa*), and the "wooly bear" caterpillar (*Arctia Isabella*), both of which are poisonous to children; the caterpillar of the Maia moth (*Vanessa Maia*), which is armed with spines that are still more annoying, stinging the hand like a nettle although accompanied by an acuter pain. Some years ago Mr. J. A. Lintner, of Albany, made some experiments upon himself with this larva, and recorded the results in an interesting article in the "Twenty-third Annual Report of the Regents of the University of the State of New York." Mr. Lintner says that this caterpillar possesses a color in marked contrast with the leaves on which it feeds, so that even a solitary individual would be ill fitted to escape the searching eye of bird or parasite that preys upon it; but the courageous bird that should venture an experimental taste would find in the stinging bristles, as it passes down its throat, no inducement to repeat the experiment.

An Ancient Rose Tree.

Herr Leunis, a well known botanist of Hildesheim (Hanover), thus describes a remarkable rose tree (or rather climber, for it is supported against the wall of a church) growing in his town, and which was in existence when Christianity itself was little more than 1,000 years old; and, if tradition is to be believed, had even then been blooming nearly 300 summers. "The oldest known rose tree in the world," he says, "is one at present growing against the wall of the cathedral of this town (Hildesheim), remarkable alike for its extreme age and for the scanty nourishment with which it has supported itself for so many centuries. It varies but slightly from the common dog rose (*Rosa canina*); the leaves are rather more ovate, the pedicels and lower leaf surfaces more hairy, and the fruit smaller and more globular. The stem is two inches thick at its junction with the root, and the whole plant covers some 24 square feet of the wall. Bishop Hezilo, who flourished between 1054–1079, took special interest in this rose as being a remarkable monument of the past; and when the cathedral was rebuilt, after being burned down in 1061, he had it once more trained against the portion of the wall which had been spared by the fire. Tradition states that, in the year of grace 814, the Emperor Ludwig the Pious, son of Charlemagne, was staying with his court at Elze. Being desirous of hunting in the huge forest where now stands Hildesheim, mass was said by the imperial chaplain at the place of rendezvous. By some mishap, when the service was concluded and the party dispersed, the vessel containing the sacred elements was left behind. On returning to the spot the following day, great was the surprise of the chaplain to find the holy vessel overshadowed by the tender branchlets of a lovely rose, which had sprung up in the night, and now filled the air with the perfume of its flowers. The emperor shortly after arrived, and by his command a chapel was built, with the altar standing on the spot occupied by the roots of the rose, that very rose which is now blooming as freshly as though a single decade, and not a thousand years, had passed over its head." But, tradition aside, certain it is that the roots of the existing rose tree are buried under the altar of the cathedral, and consequently inside the building, the stem being carried through the wall to the outer air by a perforation made expressly for it.

A Nevada Saline Valley.

About 15 miles northwest of Columbus, Nevada, is a level valley of over 4,000 acres, known as Rhodes' Salt Marsh. It is evidently an ancient lake bed, and is surrounded on all sides by high volcanic mountains. According to the *Enterprise*, of Virginia City, this valley is underlaid, a foot or two below the surface, with a solid floor of rock salt, as transparent as ice. Indeed, when the sand that covers the surface is stripped off the salt below bears a very close resemblance to a field of ice. In many places little streams of water bubble up through the mass of salt, and very frequently deep pools are found which look just like the air holes in a frozen lake. The salt made at the marsh is perfectly pure. When a tract of ground has been stripped of the surface soil the salt water rises over the bed of rock salt to the depth of a foot or two. Then crystals of salt begin to form on the surface of the water, and as they form they sink to the bottom. If the salt is to be fine, for table use, workmen stir these crystals about with shovels as they settle to the bottom, thus breaking them up. For use in working silver ore coarse salt is as good as fine, and the solid formation may be dug up with picks if necessary, but the loose crystals are more readily handled, and as much salt of that kind is formed as can be disposed of.

Not only are there inexhaustible stores of salt in the little valley, but immense stores of borax. This borax is of the finest quality known, and two or three cents per pound more can be obtained for it in Europe than for any other borax sent to that market. Splendid specimens of tincal, or natural crystals of borax, are found in the marsh embedded in the clay near the surface. Immense quantities of sulphate of magnesia (Epsom salt) and sulphate of soda (Glauber salt) in a pure state are also found. Nitrate of potassa (saltpeter) is found, but the extent of the deposits is not known.

Common potash is found in great abundance, and among the curious specimens to be obtained are what are called "cotton balls" (boreate of lime) and the fibrous crystalline borax. Also there is found an abundance of an unknown mineral. It is something described in none of the books. It does not appear in the shape of crystals, yet has a regular form of its own, presenting the appearance of branches of coral. It is thought that this may be some new salt. A quantity of it will shortly be sent East for examination.

A New Map of the Solar Spectrum.

Several months ago a new spectroscope, containing compound sulphide of carbon prisms, was constructed by M. Thollon, wherewith he effected a very much greater dispersion of light than had been attained previously. With its aid he has produced a remarkable map of the solar spectrum. The work was done in Italy, as the Italian climate offers great advantages in this respect over that of Paris. Prince Nicholas of Oldenburg, who has taken a lively interest in the subject, provided M. Thollon with a small observatory at San Remo for his operations. The map (which has been presented to the French Academy) is no less than 10 meters (about 33 feet) in length, and is composed of about four thousand lines. The well known map of Angström contained sixteen hundred lines in a length of three meters. M. Thollon has devoted great care to reproducing the physiognomy of each line; and there are many new features revealed, which will doubtless be utilized for theory. The author offers a classification of the solar lines, which is as follows: 1. Lines formed of a nebulosity without a nucleus. 2. Lines formed of a nucleus without apparent nebulosity. 3. Lines composed of a nucleus and a nebulosity, but where the nebulosity predominates. 4. Lines composed of a nucleus and a nebulosity, where the nucleus predominates.

Astronomical Notes.

OBSERVATORY OF VASSAR COLLEGE.

The computations in the following notes are by students of Vassar College. Although only approximate, they will enable the ordinary observer to find the planets.

M. M.

POSITION OF PLANETS FOR SEPTEMBER, 1879.

Mercury.

On September 1 Mercury rises at 4h. 25m. A.M., and sets at 5h. 46m. P.M.

On September 30 Mercury rises at 5h. 36m. A.M., and sets at 5h. 38m. P.M.

Mercury should be looked for early in the morning; it is at its greatest elongation on September 9, when it will rise a few degrees north of the point of sunrise.

Venus.

On September 1 Venus rises at 8h. 13m. A.M., and sets at 7h. 4m. P.M.

On September 30 Venus rises at 5h. 20m. A.M., and sets at 4h. 38m. P.M.

Venus may be followed in its early evening setting for a few days in September; it then sets so nearly with the sun as to be lost in the twilight; it is in inferior conjunction with the sun on the 23d.

Late in the month Venus may be seen before sunrise.

Mars.

Mars, Jupiter, and Saturn will be seen in the evening sky during September.

Mars rises north of east on September 1 at 9h. 35m. P.M.; on September 30 at 8h. 1m. P.M.

Mars is in conjunction with the moon on September 6; the planet is 7° south of the moon.

Jupiter.

Jupiter, the largest of the planets, and as seen through small telescopes far the most interesting, is at its best position early in September.

It rises on September 1 at 6h. 31m. P.M., and sets at 5h. 19m. A.M. of the next day.

On September 30 Jupiter rises at 4h. 29m. P.M., and sets at 3h. 7m. A.M. of the next day.

If we take the hour between 9 and 10 P.M. for our observations, the most favorable nights for watching the motions of Jupiter's moons will be:

September 5, when the first satellite, or that nearest to the planet, will be seen to leave the face of Jupiter, having been between the earth and the planet.

September 7, when the third, or largest, moon will pass from the face, followed by its black shadow.

September 13, when the fourth moon, which is the most remote from Jupiter, will move from the planet in the same way.

September 14, when the third, or largest, satellite will, during this hour, from 9 to 10 P.M., be seen to enter upon the disk.

September 27, when the first moon will disappear by going behind the planet.

September 28, when the first moon will reappear in the sky during that hour, having been in front of Jupiter; and the second, or smallest satellite, will disappear by going behind Jupiter.

Saturn.

Of the three planets seen in the east in September, Jupiter rises first, Saturn second, and Mars is the third.

On September 1 Saturn rises at 8h. 2m. P.M., and on September 30 Saturn rises at 6h. 4m. P.M.

Saturn is in conjunction with the moon September 3, south of the moon about 8½°. Saturn's light is white; it is smaller than Jupiter, and further from us. It appears much less brilliant, but it is in northern declination, while Jupiter is more than 10° below the celestial equator, so that Saturn at the time of meridian passage is nearer our zenith. Saturn comes into its best position the last of September.

Seen through a glass powerful enough to show its many moons, Saturn is an object of unceasing interest, the positions of the moons and their changes giving great variety to the view, even in a few hours.

Uranus.

Uranus is not likely to be seen, even with a telescope, during September.

It rises on September 1 at 5h. 8m. A.M., and sets at 6h. 24m. P.M.

On the 30th Uranus rises at 3h. 24m. A.M., and sets at 4h. 34m. P.M.

Neptune.

On September 1 Neptune rises at 9h. 6m. P.M., and on September 30 Neptune rises at 7h. 11m. P.M.

A Difficult Swim.

The public is getting a trifle weary of Paul Boyton's swimming feats, yet it may be worth noting that he found his recent swim from Long Branch to Coney Island "twice as terrible and severe" as the swim across the English Channel, which attracted so much attention a year or two ago. The distance from Long Branch to Coney Island was thirty-five miles; time, twenty-eight hours.