

THE PHYLLOXERA IN FRANCE.

ITS MARVELOUS REPRODUCTIVE POWERS—THE BEST MEANS OF CHECKING ITS RAVAGES—SUPERIOR RESISTING POWERS OF AMERICAN VINES—THEIR INTRODUCTION INTO FRANCE OFFICIALLY RECOMMENDED.

The following is a translation of the official report (in the form of questions and answers) recently made on the subject of the phylloxera by Dr. Menudier, of the Superior Commission appointed for that purpose by the French government. That portion of it which refers to the superior resisting qualities of American vines will be found of especial interest.

Whence comes the phylloxera? Even the oldest documents justify the assertion that the phylloxera had never existed in Europe, while, for a long time past, it has been found in the United States, causing all European vines to succumb to its attacks, after having been planted three or four years. The first points of attack in Europe have almost invariably had American stocks near at hand. Everything leads to the belief that the phylloxera was imported from America on American plants, and there are now scarcely any, save the importers, who will deny its American origin.

From what period does the phylloxera's invasion of France date? Its ravages began in 1863, at Pujaut, in the Department of Gard. Its invasion probably dates from about 1860.

At what period was the fact of its presence in the Charente Inférieure Department established? In November, 1873, at Montils, in the Arrondissement of Saintes; but the invasion must have taken place between 1868 and 1870, as some vines had already been pulled up on account of the phylloxera's ravages.

What is the phylloxera's line of march? Generally from south to north.

Is not the phylloxera's presence due to a diseased condition of the vine, superinduced by its weakened condition, or the exhaustion of the soil? No; for by placing this insect upon the roots of very healthy and vigorous vines in a region previously unattacked, all the external symptoms of the disease, and finally the death of the stock itself, result.

Is there not reason to hope that the phylloxera will disappear? Up to the present time, it is impossible to discover a single fact permitting a belief in a result so fortunate.

Have there not been instances where vines infected with the phylloxera have been left uncultivated, and have recovered by themselves? No; not a single vine really infected with the phylloxera has, without treatment, been restored to a complete state of health.

What is the extent of the ravages in this (Charente-Inférieure) Department? Of 168,945 hectares planted in vines in 1875, 135,490 were overrun, or appeared to be, at the end of 1877, and later inquiries prove that the inroads did not end there. Several thousand hectares of vines have since been pulled up.

Is not the phylloxera found, and may it not subsist, upon other plants? It has been noticed that plants, the roots of which are mixed with those of a vine, sometimes carry phylloxera, but it has been established that it is upon the vine only that the insect subsists.

How is the phylloxera propagated? In the months of July, August, and September, it takes wing, and, either of its own accord, or carried by the wind, passes in swarms over a distance of several kilometers to attack some fresh point. It penetrates the soil through the fissures between the roots and the earth, and thus step by step passes from one root to another, abandoning each as it becomes exhausted. Tools which have been used in working vines infected with the phylloxera are also means of its propagation; so, also, are plants, whether with roots or without.

Is the phylloxera as prolific as is reported? And what are the conditions favorable to its reproduction? The higher the temperature, the greater the deposit of eggs. Entomologists estimate that, in a southern climate, a single laying female will, in the course of one spring and summer, make nine deposits, and, by successive hatchings, attain a product of between twenty-five and twenty-six million phylloxera.

Upon what parts of the vine does the phylloxera stay? On the roots, the bark, the wood, and the leaves.

Upon what parts is the winter egg deposited? On the bark, both new and old, on the under side of the leaves, and even on clumps of earth.

Has the winter egg been found in this department? All search for it has proved fruitless.

Has this winter egg the importance some have attributed to it? When it was first discovered, scientists asserted that phylloxera when underground could not reproduce for a longer period than one year without the intervention of the others coming from this winter egg; and that consequently, by destroying the latter, the destruction of those at the root would follow. It was upon this assurance that the idea of washing the vines was adopted. But unfortunately, it has been demonstrated that phylloxera underground can reproduce for three years without any assistance from those coming from the winter egg, and it takes less time than that to destroy the vine.

Are there any French vines that resist the phylloxera? No, but there are some it takes longer to destroy, such as the "Colombard" and the "Cabernet Sauvignon."

Are there not some soils on which the phylloxera does less damage than on others? On land of which ninety-five per cent is sand, the inequalities are so great that the phylloxera can only advance with great difficulty. Upon such soil consequently the vine can resist for a very long time.

Are not all other kinds of soil overrun? All without ex-

ception, from the poorest to the richest, whether calcareous, silicious, or clayey, are overrun by the phylloxera.

Upon what kind of soil is the phylloxera's advance the most rapid, and upon what kind the least so? All calcareous, light, and surface soils, and those in which the vine is obliged to put forth roots clearly traceable, are very unfavorable to resistance and defense. On the other hand, all compact, moist, deep, and rich soils, into which the vine pushes deep, are favorable to resisting the phylloxera.

Has the age of a vine any influence upon its resisting powers? The younger the vine, the less it resists; the older a vine is, and the better provided with roots, the longer does it resist.

Is it prudent, in proportion as vines are infected with the phylloxera, to replant in other soil the same stocks as those that have succumbed? Never up to the present time in a region infected with phylloxera has a planting of French stocks succeeded; by the third or fourth year they are overrun, and their destruction is very rapid.

How long after the vines are pulled up do the phylloxera remain in the soil? They maintain themselves three or four years, inasmuch as, when the vines are pulled up, there still remain in the earth a certain number of roots. It is consequently prudent to wait for that length of time before replanting.

By leaving a wide space between the roots of vines, may not their preservation be hoped for? In setting out the rows from three to six meters apart, the stocks spread out their roots further, and have at command a more abundant nourishment; and it in fact results in such cases that their resistance lasts longer, but they none the less succumb in the end to the phylloxera's attacks.

Is it not possible to oppose the phylloxera, and resist its advance by means of manures? When a vine has not been attacked, it is very certain that its system of roots can be augmented by means of manures, and that there results therefrom a great vigor, enabling the vine, when the attack does come, to defend itself for a longer time. But when a vine has once been attacked, and when the extremities of its roots, which are necessary to absorption, are partly destroyed, manures in such case will bring about no good results, unless accompanied by insecticides.

By what symptoms may persons unaccustomed to the phylloxera detect its presence upon a vine? In a region where the phylloxera's presence has been announced, it may be detected as soon as there are found to be some groups of stocks the shoots of which are shorter than those of others about them. By digging about the roots, if they are the least bit eaten away, there will be seen, in the latter part of April, some little yellowish spots, united by plaques, and easily visible without the magnifying glass, when one holds the roots up and looks at them with his back to the sun. By the aid of the magnifying glass the insects themselves can be readily distinguished, and, even if one does not find any, let the extremities of the roots but show signs of destruction, or little club-like swellings, and one may be sure the phylloxera is there, or has been. In winter, the insects are of a dark brown, and it requires great difficulty to detect them, but the ravages made at the roots attest their presence or their passage.

How much time elapses between the appearance of external symptoms of the phylloxera and its actual invasion? From one to two years may be counted on; less time in weak, surface soils than in compact, deep ones, where the external symptoms take longer to declare themselves.

Are not washing and stripping of the vines good methods of opposing the phylloxera? Washing with coal-tar, or thick oil, mixed with soap, and diluted with water, has been resorted to to destroy the phylloxera and what is called its winter-egg. But the penetration of the fiber of the stock by the impure phenic acid contained in the oil has often caused the death of the stock, a fact which has necessitated the abandonment of this method. The stripping of the stumps and branches with a knife-rasp, by freeing the stock of its old bark, upon which are the phylloxera and its eggs (as well numerous other insects, and especially the pyrale), gives the vine powerful aid in point of healthfulness. At high points, and those where vines do not usually suffer from frost, the stripping is practicable in November, as the vines are pruned. In localities subject to frost vines may be stripped, beginning from January 15. This work costs about 45 francs per hectare, and only has to be repeated every three years.

The phylloxera's presence being once established is there any practicable and effectual means for opposing it? Yes; M. Dumas, the learned Permanent Secretary of the Academy of Sciences, having determined that the quantity of air contained in 1,000 liters (one cubic meter) of earth is about 333 liters, has demonstrated by frequent experiments that five or six grammes of sulphuret of carbon introduced into this cubic meter of earth amply suffices by evaporation to poison the 333 liters of air so as to kill all the phylloxera inhaling it. Sulphuret of carbon is very powerful, and it can hardly be hoped any better agent will be found.

Is not some danger incurred in the use of this substance? It is, like alcohol, very inflammable, and great care should be taken not to bring a lighted match or anything burning near it; above all when it is shut up in a room, the latter should be aired before a light is brought in. The best way to keep it is under a shed in the open air and sheltered from the sun.

Has not an attempt been made to render sulphuret of carbon easier to handle and less volatile by mixing it with

other substances? By making a heated solution of five parts black soap and ninety-five parts water, and then, after letting it cool, and at the moment when it is to be used, mixing equal parts of this soap-water and sulphuret of carbon in a can while stirring, a non-inflammable and much less volatile mixture is obtained. In the warm season, this is a good step to take, but in the cold weather it may be dispensed with.

How many holes per hectare must be made in order to thoroughly poison the soil, and what does it cost? The hectare containing 10,000 meters, about 20,000 holes should be made. As a workman can make from 1,200 to 1,500 holes per diem, the hand-labor costs 36 fr.; ten grammes of sulphuret of carbon to each hole, 200 kilos, at 60 francs, 120 fr.; total 156 fr. In the warm season, it is prudent to lessen the quantity of sulphuret of carbon by about one-third, but not the number of holes.

Are all the phylloxera killed by this plan? No, but when the application is well and timely made, a sufficient number of the insects are destroyed to enable the vine to sustain itself, and give a good yield.

Is it necessary to apply the treatment to an entire hectare when only a portion of it is infected? From the moment when a spot is discovered, dig around the roots that are infected, inclose them with stakes, and include in the treatment a certain number of healthy stocks; for instance, if 25 or 30 stocks are attacked, 100 or 150 about them should be treated. The expense for an entire hectare, considering the yield of the vines, and the prices of wines, would evidently be too great, but it should be remarked that the owner of a single hectare would at first only have to treat a twentieth or a tenth of his vines, and that if he can stop the phylloxera's propagation, and keep his vines some years longer, he will be doing well.

Does a single application of this remedy suffice? If the vine is but little infected, a single treatment may possibly suffice; but in cases where the wood of the vine is reduced to 50 or 60 centimeters in length, it is necessary to apply the treatment twice, once in the course of the winter after the vintage, and once in the spring.

Are there soils in which sulphuret of carbon is more or less active, and are there instances in which resistance is apt to prove so difficult that it would be more prudent not to attempt it? Experience indicates that in light calcareous soils, possessing a vegetal earth of 15 or 20 centimeters, with a rocky subsoil, sulphuret of carbon diffuses itself poorly and evaporates in part only, with so much pure loss, and affording no advantage. But in clayey, moist, and deep soils it diffuses itself quite regularly and effects good results, which is all the better, since it is upon such soils that are usually found the heavy-yielding vines, which will bear an outlay that the others would not.

Has temperature any influence upon the action of this remedy? Sulphuret acts with all the more certainty in proportion as the temperature is low and the soil moist.

What happens when insecticides are injected upon a plant in full vegetation? Usually there is a stoppage of vegetation for several days, and this is the more perceptible in proportion as the vine is severely attacked; beyond this, the good results of the application scarcely make themselves apparent before the following year, as the stocks have to renew their roots which have been destroyed.

How far apart should the holes be? Whether the vines be planted close together, or separated by passage ways of two or three meters, all the land attacked and a little more should be treated, and holes made for 65 or 70 centimeters in all directions, which would make about 20,000 to the hectare.

How deep should these holes be? From 25 to 40 centimeters.

How far does the vapor of the sulphuret deposited in the soil extend? Practical results indicate that the vapor does not remain confined about the holes; the scientific experiments of the Paris, Lyons and Mediterranean Railway Co., directed by Mr. Maurion, have demonstrated that under the most favorable condition it spreads nearly two meters in a horizontal direction, and downward to a depth at which it reaches nearly all the phylloxera.

Has not sulpho-carbonate of potash also been used against the phylloxera? And what is the method of using it? Sulpho-carbonate of potash, according to the learned M. Dumas, contains from 15 to 18 per cent. of sulphuret of carbon and the same proportion of potash. It is not inflammable, and is more easily handled than sulphuret of carbon. It acts not only by means of the latter substance, but also by means of the potash, which is the special manure of the vine. Its application by injectors involves the inconvenience of rapidly spoiling the instruments, and rendering them unfit for use. Messrs. Dumas and Monillefert employ it as follows: When the stocks are laid bare, about 50 grammes of sulpho-carbonate of potash are poured on; they are then watered with from 5 to 10 liters of water, and covered up again. In general, the results of this plan are very satisfactory, but the cost, by reason of the hand-labor, the carrying of water, and the use of sulpho-carbonate of potash, is much higher than that of sulphuret of carbon. The former, being much less easily evaporated than the latter, offers a certain advantage in the warm season, but not sufficient, perhaps, to compensate for its increased cost.

What is the cost of the sulpho-carbonate of potash treatment? For a single application there are required 50 grammes to the superficial meter, or 500 kilogrammes at 60 francs, 300 francs; water and hand-labor, estimated at 200 francs;

total, 500 francs. Or about five francs per are. By adding to these expenses the ordinary ones, it will be seen at a glance whether the yield of our vines is adequate to cover them.

Is it necessary to manure vines that have been treated by insecticides? The vine attacked by the phylloxera grows feeble and becomes diseased, and it is highly necessary to strengthen it by manures in which potash predominates, azote and phosphoric acid in the proportion of 2 and 3 per cent, sulphate of iron or green copperas about 5 per cent. As a potassic and phosphoric manure, cinders of Isle of Ré sea weed may be used in doses of 200 grammes per stock. Soot has also a good effect. Stassfurt salts, in which chloruret of potash predominates, may (in doses of from one to two hundred grammes) be placed around the foot of the stock to help the formation of the new roots. In this way insecticides and manures should go side by side, if it is sought to obtain a satisfactory result.

Have endeavors to fight the phylloxera by means of insecticides and manures been made to some extent in this department? Upon the Plaud-Chermignac property, about 6 kilometers from Saintes, there is a vineyard some 30 hectares and 50 ares in area, which for six years has been overrun by the phylloxera. The soil is very varied, in some places the calcareous and the plastic, clayey soils lie side by side, and it is very easy to observe the diverse results obtained according to the nature and depth of the different soils. All the patches of vines, without exception, have been attacked by the phylloxera, and have been treated with sulphuret of carbon and sulpho-carbonate of potash. In comparing the vines that have undergone treatment with the neighbors' vines that have remained without treatment, one cannot help seeing the good results of the use of insecticides in conjunction with manures.

Is not submersion a certain means of destroying the phylloxera? Submersion of the stocks for forty days is unquestionably a certain means of destroying nearly all the phylloxera on a vine. But to adopt this method the land must be low, pervious on top, impervious beneath, and located in the vicinity of water. In our climate, where in low lands vines very easily freeze, great care is taken not to plant them there, and consequently submersion can seldom be resorted to hereabouts. It should also be noticed that as soon as a proprietor submerges a vine he moistens the soil of his neighbor, who, in case he wants no water, has a right to complain, and may bring suit, as is at present the case near Libourne. Submersion, moreover, under very favorable circumstances involves an expense of about 150 francs per hectare. It should not be forgotten that to this expense, annually repeated, must be added the cost of manures, which are in such a case indispensable, as the soil is infused with lye by the use of the water.

Since French vines do not withstand the phylloxera's attacks, would it not be possible by sowing to obtain some new species that resist better, or to graft French cuttings upon French wild vines? All attempts of this character, made and repeated at various points, have caused nothing but disappointment and deception.

It appearing that the methods of fighting the phylloxera by insecticides, manures, and submersion are not attended with profit in this locality, except in case of vines planted in soil of considerable depth, can there not be found in the resistance offered the phylloxera by certain American stocks a more economical way to the preservation of our own? And, to begin with, is the resistance of these American stocks real? For fourteen or fifteen years past, in the Departments of Gard and Gironde, the stock called the "Jacquez" has resisted very well, in the midst of the phylloxera's ravages, and given good yields long after the native stocks have succumbed. The "Herbemont," the "Cunningham," the "Taylor," the "York Madeira," and the "Vitis Solonis," after being planted six or seven years in the very focus of the phylloxera's attacks, are resisting, and show a very handsome growth, while the other stocks have succumbed.

Will this resistance be permanent? A resistance which in the case of the "Jacquez" has existed for fifteen years, in the case of the others for six or seven years, and which has always existed in America, offers almost indisputable assurance for the future, and no argument or facts why it should prove otherwise can be discovered.

Is the "Clinton," which is quite widely planted, worthy of recommendation? When planted in rich, fresh soil it sustains itself passably well; but deprived of these conditions it does not resist the phylloxera. It gives, too, a poor wine, with a foxy taste. This stock has been abandoned by all good wine growers.

How is the resistance of American stocks explained? The fiber of American resisting roots is, according to M. Foex, much denser and closer than that of our European vines, and turns into wood (lignifies) much more quickly. So that in the American roots the phylloxera's puncture only attacks the outer bark, upon which it produces little excrescences which fall off like warts. In the case of French roots its puncture causes decay. Some stocks, such as the "Jacquez" especially, the "Herbemont," and the "Cunningham," can be planted and will yield wine without being grafted. They possess a resisting power equal to every test. The "Jacquez," when cultivated in this locality, blooms and ripens at the same time with the wild grape; it produces a good red wine of a very dark color, and is highly valued by the trade. It is not difficult of cultivation as regards choice of soil. Its grapes, when ripe, keep for a long time without decaying. Up to the present time it is a stock against which

nothing can be said. The "Herbemont" yields a fine red wine, not very dark in color. It blooms six or seven days later than the "Jacquez," and at the same time with the "Balzar;" we shall know this year whether it ripens in this climate, which, however, is probable. It would be a very good vine to plant in our dry, calcareous, and stony soils, in which it flourishes and grows extremely vigorous. The "Cunningham" produces at once, and quite a good wine, something like Madeira. In 1878 it bloomed in this locality ten or eleven days later than the "Jacquez." We shall not be decided until the fall as to its period of maturity. Other American stocks yielding wine at once are under trial.

Is there not some difficulty about the "Jacquez," the "Herbemont," and the "Cunningham" taking root? In 1877, in this locality, the "Jacquez" and the "Herbemont," being placed in nursery and in fresh soil, yielded a return of 70 per cent. The "Cunningham" yielded less. The "Riparia," the "Wild Cordifolia," the "Taylor," the "York Madeira," and the "Vitis Solonis" have great powers of resistance to the phylloxera, but yield so little wine that they should be used only to bear graftings from French stocks. They have the advantage of taking root very easily.

What is the best method for grafting French vines on the American ones? Joining a French and American slip, by means of the "English graft," and placing them in the nursery for the winter and spring. In the following year those that have been successful are carefully taken up and set out, either with slats or in pots. Another good way is this. The American cuttings, after having been put in the nursery in winter or spring, are taken up, the French slips are then grafted upon them (by the English plan), and they are then set out. Success in this way is almost certain. A third way consists in planting the American slips permanently in the vineyard, and then, in the second year, grafting the native cuttings upon them, whether by slitting or by the English plan.

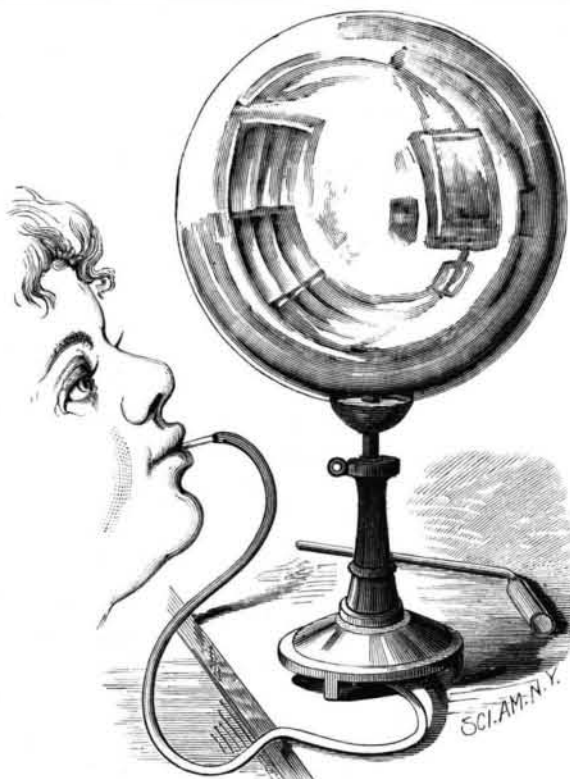
Is there not some danger that French stocks grafted upon American ones will yield an inferior quality of wine? Experience has already pronounced in favor of French fruit trees and vines; and the wines coming from French stocks grafted upon American ones are absolutely the same as if they had not been grafted.

What, in short, is the best course to follow when a vineyard is attacked? If the vineyard is on surface soil, and the spots on the vines not very numerous, try to oppose the phylloxera in favorable weather by sulphuret of carbon or sulpho carbonate of potash, so as at least to retard its inroads and damages. If the vineyard is on deep, moist, and compact soil, struggle perseveringly and incessantly. The outlay will be repaid with interest; for those who are able to preserve their vines longest may be sure of being largely remunerated for their advances and labor. On surface as well as on deep soil do not hesitate to establish at once nurseries of American resisting vines, whether for the purpose of producing wine from them at once or for use in bearing grafts of French stocks.

What should be done in a section not yet overrun? Manure the vines and cultivate them carefully; and if there is any ground not in use sow the grape stones of American stocks, so as to be ready to start a second vineyard, and thereby not be taken unawares. In sowing grape stones there is absolutely no risk whatever of introducing the phylloxera, while, on the other hand, it would be extremely imprudent to introduce into any non-infected section in this locality, either American or French stocks coming from regions already infected.

NEW BUBBLE BLOWER.

The accompanying engraving represents a simple device for blowing and holding soap bubbles, recently patented by



GREENWALT'S BUBBLE BLOWER.

Mr. Daniel Greenwalt, of Millersville, Pa. It consists of a hollow standard supporting a small bowl for holding the

soap solution at the top, and having a flexible rubber tube provided with a mouth piece at the bottom. The bowl being filled with the soap solution a small bubble is formed over the end of tubular standard that projects above the bowl by placing over it the end of the curved tube, shown on the table, and then removing it. The bubble is then enlarged by blowing through the flexible tube.

This apparatus is not only of interest as a toy for children, but it is also of value in physical experiments.

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 AUGUST, 1879.

Mercury.

Mercury should be looked for after sunset in the first half of August, setting earlier than Venus, and at a point of the horizon north of Venus.

On August 1 Mercury sets at 8h. 12m. P.M.; on the 15th at 7h. 10m. P.M., and on August 31 Mercury rises at 4h. 31m. A.M., and sets at 5h. 49m. P.M.

Mercury's motion is direct among the stars from August 1 to August 9; after August 9 it is retrograde.

Venus.

Venus and Mercury can be seen after sunset in the first half of August. Venus increases in brilliancy until August 19, when it is at its maximum.

Venus sets August 1 at 8h. 57m. P.M. On August 31 at 7h. 9m. P.M.

Venus is near the crescent moon on August 20.

Mars.

Nearly coincident with the setting of the smaller planets is the rising of the larger planets.

On August 1 Jupiter rises as Venus sets. Saturn follows Jupiter after about an hour and a half, and Mars, having moved away from Saturn toward the east, follows Saturn.

On August 1 Mars rises at 10h. 55m. P.M. On August 31 Mars rises at 9h. 38m. P.M.

The color of Mars makes it easy to find it, and it can be known by referring it to Jupiter and Saturn; it follows them in rising, but is much farther north.

Jupiter.

The brilliancy of Jupiter in the eastern skies will be as noticeable as that of Venus in the western.

On August 1 Jupiter rises at 8h. 42m. P.M. On August 31 Jupiter rises at 6h. 36m. P.M.

If we take the hour from 9 to 10 P.M. for observations of Jupiter, the most marked changes in the positions of the four moons of the planet will be on August 13.

At 9 P.M. Jupiter will be seen with only one moon, and that one the most distant. About 10 P.M., almost at the same minute, the largest and the smallest moon will come out from behind Jupiter, and another will leave the face of the planet, having been moving across the disk, so that three moons will seem to be clinging to the planet at the same time.

Saturn.

On August 1 Saturn rises at 10h. 6m. P.M. On August 31 Saturn rises at 8h. 6m. P.M.

We are now in such position relatively to Saturn that we see the ring more opened, and a small telescope will show the projection of the ring as handles extending beyond the ball of the planet.

Uranus.

Uranus will not be likely to be seen during August.

This planet rises on the 1st at 7h. 1m. A.M., and sets at 8h. 20m. P.M.

On the 31st Uranus rises at 5h. 12m. A.M., and sets at 6h. 28m. P.M.

Neptune.

On August 1 Neptune rises at 11h. 8m. P.M. On August 31 Neptune rises at 9h. 10m. P.M.

According to the Nautical Almanac Neptune is in conjunction with Mars August 14, at 3h. 31m. A.M., Washington time, Neptune being south of Mars 15m., or one half the diameter of the moon.

Occultation.

The beautiful star Antares, in the constellation of the Scorpion, will be occulted by the moon on August 24.

The American Nautical Almanac gives 10h. 35m. as the time when the star will disappear behind the moon, as seen at Washington.

An ordinary glass will show the phenomenon, and probably the companion stars of Antares may be seen.

An Aged Turtle.

About the middle of June, a turtle was taken in the St. John's River, Florida, with the Spanish coat of arms and the date 1700 engraved upon his back. There was also inscribed in Spanish the sentence: "Caught in 1700, by Hernando Gomez, in the St. Sebastian, and was carried to Matanzas by Indians; from there to the Great Wekiva." The "Great Wekiva" is the name by which the St. John's River was formerly known. The turtle was put back into the river with the added inscription: "Eastern Herald, Palatka, Florida, 1879."

THE American Watch Tool Company, Waltham, Mass., sends us a sample of a screw having 375 threads to an inch, size at bottom of thread $\frac{1}{1000}$. They have just completed the lathe for such work.