THE CASTOR OIL PLANT AS A TREE.

In France, under favorable circumstances, castor oil plants sometimes grow to the hight of ten or even 12 feet, and have leaves nearly a yard in width. In England, they give indications of becoming arborescent in autumn; but the cold weather which soon afterwards sets in puts a stop to further progress in that direction. The tree ricinus, shown in our engraving, is not a distinct species; on the contrary, it is the type of all the varieties with which we are acquainted, and may be met with continually in warm climates, like those of the Riviera and Algeria, and even as far north as Montpellier, in France, provided it be protected against frost by straw or matting.

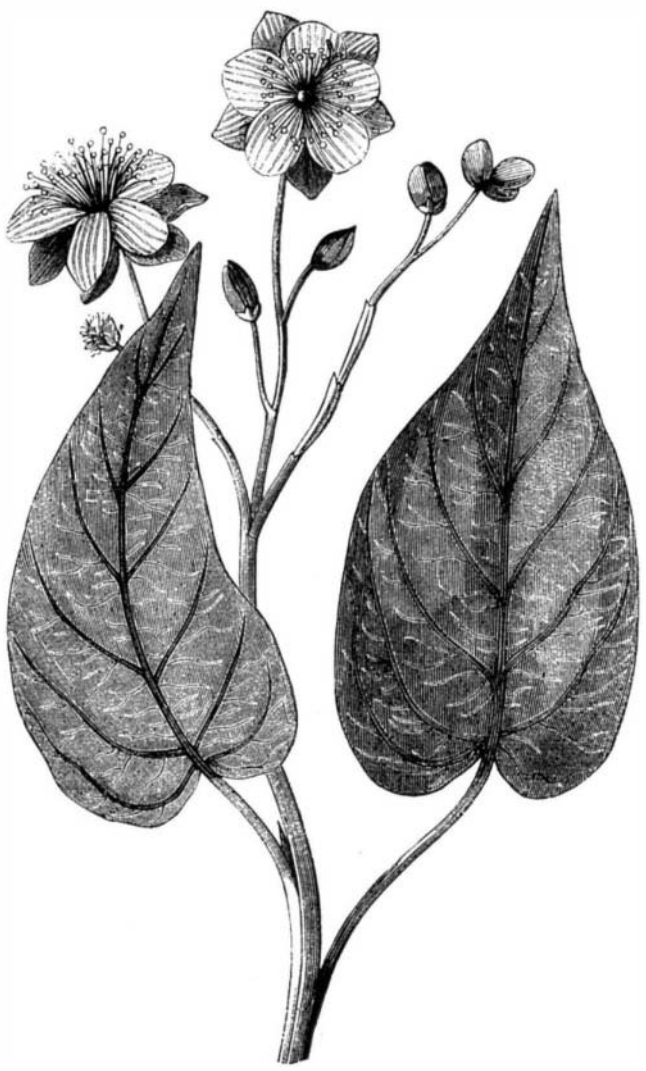
The common castor oil plant, says a correspondent of the English *Garden*, likes a warm aspect and a light rich soil. It is easily, as all of us know, raised from seed, which should be sown in heat early in spring. As soon as the young plants are old enough to handle, they should be pricked out separately into pots, and again placed in heat. They must be well watered and shaded until they have become thoroughly established, and should be allowed plenty of air on fine days, otherwise they will throw out long, weak shoots that very materially detract from their beauty. Their growth being very fast, the roots soon fill the pots in which they are placed, and when that occurs they must be shifted into larger ones. Towards the end of this month they may be gradually hardened off, and finally transplanted out of doors in good rich soil when all danger from frost is over, care being taken to give them plenty of water in dry weather. When castor oil plants are once transplanted, their roots spread so rapidly that they cannot be lifted and potted again successfully; therefore, if they are to be grown in pots, they must always be kept potted, shifting them, of course, into larger ones from time to time. The only care which they require during the winter is frequent but moderate watering, giving them air whenever the weather is favorable. Thus treated, castor oil plants may be kept in growth and beauty for several years in succession, when they will form trees, which, if not as large as that here represented, or those grown in more favored climates, will at least add beauty to our gardens in summer. The most notable varieties are *ricinus sanguineus*, the stem, leaf stalks, young leaves, and fruit of which are of a blood red color; *r. Borboniensis*, which in southern climates attains a great hight; and *r. giganteus*.

THE CASTOR OIL PLANT.

BIXA ORELLANA—ANNOTTA.

It is from this shrub, the foliage and flowers of which is now figured, that the annotta of commerce, commonly called annatto, is produced. Plants of it are seldom seen except in botanical collections; but they are not devoid of ornament by their fine green leaves and chaste pink flowers. When grown from seed, the plants attain a large size before producing flowers: but when raised from cuttings they flower freely when in a comparatively dwarf state. Cuttings of half-ripened wood strike readily in heat under a bell glass. The plants require a summer temperature of 75° to 85°, and a winter temperature of 50° to 60°. This shrub grows spontaneously in South America, and is cultivated in the East Indies. The fruit is like a chestnut, a two-valved capsule covered with flexible bristles, and contains a certain number of seeds smaller than peas. These seeds are covered with a soft, viscous resinous pulp, of a beautiful vermilion color and unpleasant smell like red lead mixed with oil, and it is this matter which constitutes annotta or annatto. The mode in which it is obtained, says the *Journal of Horticulture and Cottage Gardener*, is by pouring hot water over the pulp and the seeds, and leaving them to macerate, and then separating them by pounding them with a wooden pestle. The seeds are then removed by straining the mass through a sieve; and the pulp being allowed to settle, the water is gently poured off, and the pulp put into shallow vessels, in which it is gradually dried in the shade. After acquiring a proper consistence, it is made into cylindrical rolls or balls, and placed in an airy place to dry, after which it is sent to market. It is most common in the English market, and is in the form of small rolls, each 2 or 3 ozs. in weight, hard, dry, and compact: brownish without and red within The other process of manufacture is that pursued in Cayenne. The pulp and seeds together are bruised in wooden vessels, and hot water poured over them; they are then left to soak for several days, and afterwards passed through a close sieve to separate the seeds. The matter is then left to ferment for about a week, when the water is gently poured off, and the solid part left to dry in the shade. When it has acquired the consistence of solid paste, it is formed into cakes of 3 or 4 lbs. weight, which are wrapped in the leaves of arunda or banana. This variety is of a bright yellow color, rather soft to the touch, and of considerable solidity. Labat informs us that the Indians prepare an annotta greatly superior to that which is brought to us, of a bright shining red color, almost equal to carmine. For this purpose, instead of steeping and fermenting the seeds in water. they rub them with the hands, previously dipped in oil, till the pulp comes off and is reduced to a clear paste, which is scraped off from the hands with a knife, and laid on a clean leaf in the shade to dry. Mixed with lemon juice and gum, it makes the crimson paint with which Indians adorn their bodies; and they employ the leaves and roots in cookery to increase the flavor and give a saffron color.

Annotta is principally consumed by painters and dyers; butit is also used to color cheese with, a pale yellow or flesh color. The Dutch use it for hightening the color of their butter, and it is used for the same purpose in some American and English dairies.



BIXA ORELLANA.

A Hospital in a Crater.

The Board of Physicians of the Neapolitan Hospital for Incurables have determined to build a hospital in the crater of Solfatara, lying between Naples and Pozzuoli, in Southern Italy. The vapor that arises from the crater has been found to be charged not only with sulphur but also with arsenic, and it is said that several persons suffering from lung diseases have been restored to health by inhaling this vapor for a few weeks.

Facts About Air and Mine Ventilation.

At a recent meeting of the North Staffordshire Mining Institute, a paper by Mr. Wardle, of Burslem, was read on this subject. He said the temperature of the earth increased as they descended at about 1° Fah. for every 50 feet to 60 feet. At the deep coal pit at Dukinfield, the temperature was constantly 75° Fah. at a depth of 2,151 feet, and at a depth of 17 feet it was only 1° Fah., which gave an increase of 1° Fah. for every 89 feet only. The average degree of temperature of the earth was 1° Fah for every 55 feet in descent to a depth of 1,800 feet, and afterwards 1° Fah. for every 44 feet. At 10,000 feet, the temperature would be 212° Fah., provided all other circumstances remained the same; at 20 miles, 1,760° Fah.: and at 50 miles it would be 4,600° Fah., heat sufficient to melt any known metal. Thus, the deeper the shafts of their coal mines, the greater the amount of natural ventilation they would obtain. A current of air, traveling at a speed of 10 feet per second, gave a pressure of 0·492 lb. to the square foot at 16 feet, =0·989; at 51·34, =6·027; and at 200, =39·2, as experienced on the surface of the earth. These might be described as, first, a breeze; second, a light gale; third, a gale; and, fourth, a hurricane. Increased velocity of wind meant greater friction or higher water gage. Air was perfectly elastic; by pressure it could be squeezed into less bulk; and if that pressure were withdrawn, it filled the same space as formerly. Heat had the same effect upon it as pressure. A cubic foot of air weighed 223 grains; a cubic foot of water weighed 1,000 ozs.; a cubic foot of watery vapor weighed only 272 grains. So that the more vapor there was in the air, the lighter it would be. Friction was estimated by the force required to overcome it. Friction of air increased or decreased in the same proportion that the extent of the rubbing surface exposed to the air increased or decreased. A circular airway offered less resistance in proportion to its area than any other form, because its circumference was less in proportion to its area than the perimeter of any other figure. Airways should be as large and with as smooth a surface as possible. Splitting the air current was preferable to taking the whole current of air round the workings in one body. Generally speaking, splitting the air increased the quantity of air obtained by a given expenditure of power; but the benefits to be derived from splitting were limited by the area of the shaft.

The Twinkling of the Stars.

The scintillation of stars, and its close connection with changes of weather, has, as is known, much interested Humboldt, Arago, Kaemtz, Secchi, and many others; and recently it has also been the subject of valuable spectroscopic researches by M. Respighi. M. Montigny, who some time ago investigated scintillation in relation to the special characteristics of the light of different stars, publishes in the *Bulletin* of the Belgian Academy, No. 8, an elaborate report upon his researches into the connection existing between scintillation and various meteorological elements. The chief results, arrived at after a discussion of 1,820 observations made on 230 days on 70 different stars, are as follows: The intensity of scintillation (measured by a special apparatus, the *scintillomètre*) increases invariably with the occurrence or approach of rainy weather, and with the increase of tension of vapor in the air on one side, and the increase of pressure and decrease of temperature on the other: the influence of the two former factors being far more sensible than the combined influence of the two latter. The scintillation, which is on an average stronger during winter than during summer, increases with the arrival of moist weather at all seasons. It increases also not only on rainy days, but one or two days before, decreasing immediately after the rain has ceased. Moreover, the intensity of scintillation increases during strong winds, and with the approach of barometric depressions, or *bourrasques*, the increase being most pronounced when the depression passes near to the observer. It then largely exceeds the average increase corresponding to rainy days; and the influence of great movements in the atmosphere totally counteracts the contrary influence of a lowering of pressure. M. Montigny is thus correct in saying that a continued investigation of scintillation would be of great service, not only for the prevision of weather, but also for the general study of meteorology, affording a very useful means for the exploration of the higher regions of the atmosphere.—*Nature*.

Appleton's Encyclopædia.

The new revised edition of this magnificent work is now completed, and forms one of the most valuable and important collections of popular knowledge ever brought out in this country. The printing materials, engravings, etc., have alone cost the publishers over half a million dollars. The reader will be able to form an approximately correct idea of the magnitude and sterling character of the work by consulting the publisher's advertisement given on another page. The work more than justifies what is there stated.