larity, and at times drooped as if weary or discouraged in trying to find something upon which it might entwine itself.

Thus far no opportunity had been given the plant to climb, since it was desirable to see what it would do to meet the absence of some support. On the 26th a new route of travel was undertaken at six o'clock in the morning, and at nine o'clock the extremity, which was near the floor, at the left side of the pot, had described a circle six inches in diameter. It then slowly swept around to the right side and made another irregular circle, and then returned to the left side of the pot; these movements occupied just twelve hours. The track of the tip of the vine was carefully traced with a pencil upon a sheet of paper laid beneath it, and the entire line of travel measured no less than six feet nine inches.

During the evening the plant became quiet, and probably remained so all night. At ten A. M. the next day, however, it began pointing its tip in various directions, and at noon assumed the form of a corkscrew, about four inches long, which posture it retained until night and then straightened out.

On May 1st the vine was lifted and tied to a vertical support —a large thread—where it remained entirely quiescent for two days. Then it began growing again as if it had recovered from what had been for six days a condition near the point of death.

Another vine was observed carefully during several days of cloudy weather. It uncoiled itself from the stick and reached away toward the light at an angle with the horizon of some forty-five degrees. It was carefully recoiled about its stick, but after it had grown some three inches more it unwound itself and stood away toward the window as before. Time after time during the continuance of the cloudy weather it was brought back to its support, but invariably left it. Then followed a fortnight of bright, sunny weather during which the vine showed no disposition to escape from its stick or stop its twining growth.

Attempts were made to induce another plant to twine in the direction opposite to its normal one, but no ingenuity could deceive the plant as to its proper course. All the experiments seemed to show how much like an animal was the plant in its sensitiveness, not only to changes of light and temperature, but to harsh treatment. Whenever restrained or forced, no matter how tenderly, out of its natural method of growth, all progress was retarded and the health of the vines disturbed in a marked degree. Plants seem to be creatures of feeling and the similarity of movement and of apparent purpose between them and the lower orders of animals are used to strengthen their theory by those who hold to the doctrine of the identity of life in the two kingdoms.

Erie, Pa. *T. D. Ingersoll.*

The Blue Gum Tree.

THE Australian Blue Gum, *Eucalyptus globulus*, has become one of the most prominent and characteristic features in southern California forestry. A tall, slender tree, attaining to an immense height, this native of Van Dieman's Land and Australia has taken firm root upon the Pacific coast.

Many a hillside and plain—a few years ago treeless, parched and brown—has been transformed into a mass of living green, furnishing the refreshment of shade and filling the air with a health-giving, grateful fragrance, through the slight encouragement given to this tree by man. From Eureka to Ensenada—a distance of nearly a thousand miles—this tree has steadily gained in favor. In its native land it grows to a height of three hundred and fifty feet, with a diameter of fifteen feet and more. Already many of the older trees on the coast range are from one hundred to one hundred and fifty feet in height.

A forest of Eucalyptus is something magnificent. Stately in proportions, the trees tower tall and straight above any of our indigenous species in the south, growing so close together as to form an almost impenetrable shade. Altogether it is a spectacle to gladden one's eyes in this "dry and thirsty land." Millions are already planted, and hundreds of thousands are annually planted because of the valuable qualities of the Eucalyptus as a forest-tree. Quick in its growth, it is an unfailing source of supply of fuel and valuable timber in a land where wood and lumber are scarce.

In San Diego County these trees are extensively grown for fuel, but thousands of them are also annually planted for their beauty, as shade or ornamental trees in parks and along avenues, while other thousands are planted as wind-breaks to young orchards, for which use they are well adapted.

The Eucalyptus is easily propagated from the seed, a pound of which may be obtained for five dollars. From this quantity of good seed over three thousand trees can be raised. The first seedlings sold in California, imported from Australia, sold at auction for five dollars apiece. To-day they are worth a cent a plant.

The Eucalyptus thrives on the poorest soil, and once established firmly requires no further care or attention. It seems to do best on the sandy bottoms, but may also be made to do well on the higher mesa lands if once it is able to establish itself, when it will send its roots down a long way where it can get an unfailing water supply. That its culture on cheap lands is exceedingly profitable needs no further demonstration in California. A Eucalyptus-forest may be cut down once in every five (some say three) years to advantage, when new shoots will start from the stumps and a new forest arises from the ruins of the old, and without the first expense of either plowing, cultivating or irrigating, since the roots are already established, vigorous, healthy and uninjured by the fall of the parent trunk.

In the presence of the invigorating fragrance exhaled by this tree, fevers and malaria largely lose their terrors. In California, a dry, pure atmosphere like ours, the valuable quality of this tree, its anti-febrile properties, has naturally been largely lost sight of, as compared with other more important interests. The tree absorbs water with surprising facility, and it is this that is considered by many the basis of its prophylactic properties.

The Blue Gum or Fever-tree was introduced into Paris by the French government in 1860, and was subsequently planted in Africa, Spain, Italy and portions of France, where many large forests have been produced. In 1875 the City Council of Houston, Texas, decided to give the tree a trial in view of the yellow fever epidemics that had periodically filled the city with mourning. During 1875–76 the city was freer than usual from the disease, and in 1877–78, according to the Health Officers' report, was one of the healthiest cities in the Union. As to the subsequent experience of that city I have no data at hand.

The Eucalyptus shows remarkable celerity of growth, having attained a height of sixty feet in eleven years, and in India its growth has been yet more rapid. In Mexico it has succeeded remarkably well at elevations of from 2,500 to 7,000 feet. It has withstood a temperature of nineteen degrees F., but generally succumbs at seventeen degrees F. Frost will kill the young trees.

The timber is used for a great variety of purposes, in shipbuilding, and in all kinds of out-door work. It is about equal in quality to the best English Oak and to the American Ash, and if Californians will have the patience to grow the tree for timber rather than for fuel—as they now do almost exclusively —they might expect yet handsomer returns from its culture than now.

The tree is remarkably free of any disease and of insect pests; moths, mosquitoes, fleas and other insects are said to forsake a room where the leaf branches of the Eucalyptus are freely scattered about.

Notwithstanding there are over one hundred and fifty species of the Eucalyptus, *E. globulus* alone has met with widely extended popular favor in California. Several others like the Red Gum and the Iron-bark seem to thrive equally well with us and are gaining ground.

Thanks to this friendly genus it is only a question of a century or less before the now desert-like plains of southern California can be covered with a growth of gigantic trees.

San Diego, Cal. *C. R. Orcutt.*

Nematodes and the Oat Crop.

THE Oat crop at the time of writing throughout New Jersey gives all the signs of failure. Many farmers have already plowed the fields again for some other crop, while many more are anxious to know what to do. In general appearance the Oat-plant is dwarfed, and nearly all the leaves, especially the lower ones, are brown and dead. As the wheat, rye and grass crops have been badly attacked this spring by the aphis or grain louse, many farmers have ascribed the wretched appearance of the oats to the same enemy, but I am assured by Professor Smith that the aphis cannot be held responsible for a great part of the destruction that is so widespread among the Oats of the state. Therefore it seemed advisable to make a microscopic examination of the diseased plants in order to discover whether the cause of this disaster was not some parasitic fungus. Specimens in root, stem and leaf, from several localities, have been examined, and nothing in the nature of a rust, smut, mildew, mould or blight was found. It may be true that a low form of organism belonging to the group of bacteria is the cause of the unhealthy growth.