torpedo charge was electrically fired from the "Vernon." There was a terrific explosion, and a huge column of water was hurled into the air to a height of some 140 feet. The target vessel was completely buried in spray, which was thrown right over her mast tops. The ship reeled heavily under the force of the explosion, and before the water had settled down she commenced to founder. Arrangements had been made to tow the torpedoed vessel back again into the harbor immediately after the explosion, but the bottom of the vessel was damaged far more extensively than had been anticipated by the force of the explosion, and it was found impossible to tow the battered hulk back again into the harbor in time. The powerful tugs which were in attendance for this purpose thereupon set to work and pushed the foundering ship toward the shore, and succeeded in running her aground on a mudbank, where she was beached. The ship is to be patched up and rendered sufficiently watertight to enable her to be towed back into the harbor, where she will be drydocked in order to enable a minute examination of the damage wrought by the explosion and the resisting qualities of the cellulose to be made. As several portions of the cellulose, however, were hurled into the air, it is apparent that a portion of the specially constructed compartment packed with the cellulose had been blown up also. The exact extent of the damage, however, will not be known until the vessel has been docked.

EUCALYPTS AND THE WORLD'S FUEL.

BY V. E. JLINE.

The world's impending wood famine, which is predicted both by foresters and publicists, is likely to be averted after all through the planting of eucalyptus forests. As a result of the scientific enthusiasm of the late Baron Ferdinand von Mueller, government botanist of Victoria, Australia, large areas in every continent are being planted to this phenomenally fast-growing hardwood genus. Conditions to-day seem to promise fulfillment of his prophecy that "eucalypts are destined to play a prominent part for all time to come in the sylvan culture of vast tracts of the globe." To that prediction this eminent scientist added the significant belief that for hardwood supplies, for sanitary measures and for beneficent climate changes, many of the countries of the earth would have to rely on eucalypts during uncountable periods.

Dr. Alfred James McClatchie, agriculturist and horticulturist in the employ of the United States, says that all who have lived where eucalypts grow can realize fully the force of Von Mueller's prophecy and the great value of the genus to mankind, both present and prospective.

Inasmuch as it is claimed for the eucalyptus that it is the most useful of all trees, it is a matter of considerable scientific and economic interest that the cultivation of the genus in America is being conducted on a generous scale. In fact it may surprise many to learn that the eucalyptus has been planted more extensively in America than any other exotic forest tree.

Among other important things, eucalypts are held by foresters to be unequaled as a forest cover, as windbreaks, as shade trees, as a source of timber, fuel, oil, and honey, and as improvers of climate.

Although only a few varieties have thus far been tried in this country, the success achieved in adapting them to American soil warrants the government scientists conducting experiments in saying that the tree has already served more esthetic and utilitarian purposes than all other forest trees that have been planted on this continent.

Thus far in America experiments have been made only with tropical and subtropical varieties. The genus includes about 150 species, some of them adapted to tropical swamps, others to desert sands, and still others to lofty altitudes.

The fact that they grow rapidly and in a great variety of soils and climates has led Dr. McClatchie to make experiments with a view to utilizing them as forest covers in mountainous and hilly districts and on the plains of America, and particularly for the reforestation of burned districts. He states that the rapid-growing species, less resistant to frost, may be planted on the lower part of mountains, and the somewhat slower growing, more hardy ones farther up the mountain sides. Those adapted to Alpine situations may be planted to a height of from 4,000 to 6,000 feet.

Hitherto in the introduction of eucalypts many mistakes have been made. In southern Arizona, for example, the blue gum does not endure the heat of summer, while in Florida the frosts of winter have been fatal to it. But in some of these places more resistant varieties have been introduced and are growing satisfactorily. Dr. McClatchie predicts that a more careful and systematic study of the genus, accompanied by cultural tests, will undoubtedly result in the discovery of additional and probably better species for these and other regions. He adds that the introduction of heretofore untried species is continuing, and that every year witnesses some new departure in their propagation. The development of these trees is being closely watched by those interested in their planting.

As to the rapidity of growth and consequent value of the eucalyptus as a wood supply, it is interesting to know that when they are five to seven years old, groves of blue gum or manna gum may be cut to the ground for fuel and they may be cut every six or eight years thereafter. The yield from each cutting is commonly from fifty to seventy-five cords of four-foot wood per acre. One seventeen-acre grove between Los Angeles and Compton set in 1880 and cut for the third time in June, 1900, produced 1,360 cords, an average of eighty cords of four-foot wood per acre. In much of the Southwest there is no known species that can take the place of other rapidly disappearing woods and at the same time supply the increasing demand for hardwood fuel. In California the leaves as well as the wood are utilized for fuel purposes. A Los Angeles company is making for market bricks composed of blue gum leaves and twigs mixed with crude oil, and the product is reported to be an excellent fuel for domestic use. The entire tree is thus utilized. This new use of eucalypt leaves suggests to Dr. McClatchie the possibility of many industries growing out of the extensive planting of the trees.

The phenomenally rapid growth of these trees has been demonstrated in the groves of Ellwood Cooper near Santa Barbara, Cal., where blue gums planted twenty-five years ago are as large as oaks whose rings show them to be 300 years old.

Word comes through American consuls that eucalypts seem destined to revolutionize sylviculture in France, Algeria, Italy, Spain, Corsica, Portugal, Cape Colony, and the Transvaal. That the treeless regions of South Africa are being covered with fast-growing eucalyptus forests is a matter of much significance to that new empire of civilization.

The French are reported to be the most active and intelligent in Europe in propagating the tree. Hardly less sanguine than the French are the Spaniards, who hope by cultivating the eucalyptus to secure an ample supply of woodland and wood.

In Australia and the neighboring islands eucalypts are one of the important sources of the general timber supply and are the chief source of the hardwood timber used there. The uses made of eucalyptus timber are remarkably diverse. It enters into the construction of buildings, ships, bridges, railroads, piers, telegraph lines, fences, paving, vehicles, agricultural implements, furniture, barrels, and a great variety of minor articles. In notes on the commercial timbers of New South Wales, Mr. Maiden names twenty-five special purposes for which the timber of eucalypts is used in that colony. Not only in Australia is the timber of eucalypts used thus extensively, but it is exported in large quantities, the bulk of the hardwood lumber shipped being from these trees. R. Dalyrimple-Hay, in his work entitled "The Timber Trade of New South Wales," names thirteen species that furnish timber for export. Shipments are made to distant parts of the globe, including Africa and England.

The piers at Santa Barbara and at neighboring sea towns are maintained with piles of the blue gum. Mr. Cooper has sold from his grove nearly $10,000 worth of piles in the last ten years. At one seaport the superior value of eucalypt piles is reported to have been demonstrated through the surreptitious acts of a contractor. Lacking a few piles of the timber specified in the contract (Oregon pine), he is said to have obtained blue gum timbers from the vicinity and to have ordered the night crew to place them on the inside where their presence would not be detected. When it became necessary to repair the pier a few years ago, sound piles were found among others nearly destroyed, and upon examination they proved to be blue gum trees. The demand for the piles is now greater than the groves of eucalypts can supply. It seems probable that eucalyptus piles may become one of the important crops grown by farmers in some sections of America. As the trees now planted become larger, and as planting becomes more extensive, the eucalypts undoubtedly will prove their value for an increasing variety of purposes. Dr. McClatchie makes it clear that the eucalypts have not been grown long enough in America to have become a source of lumber here. The principal uses made of the timber thus far in America are for fuel, piles, posts, for some of the parts of farming implements, and for pins for insulators on long-distance transmission keys. He adds that the eucalypts deserve to be better known.

In Germany eucalyptus oil is regarded as an excellent remedy in consumption.

Among scientists there is some variety of opinion concerning the effect of the eucalyptus upon climate. Dr. McClatchie sums up the controversy by stating that when the nature and habits of the trees are considered, it is entirely reasonable to believe that they have an effect in benefiting the atmosphere in the region of their growth. His grounds for this belief are: First, their great capacity for absorbing moisture from the soil and thus reducing the quantity of stagnant water in the ground at their roots; second, their corresponding power of giving off fresh from their foliage the water thus taken up; third, the exhalation from their leaves and other parts, of volatile oils, which affect the climate not only directly but by changing the oxygen of the atmosphere to ozone; fourth, the purification of germ-infested matter by the foliage dropped upon the ground or in pools of stagnant water.

Notwithstanding the tree's capacity for absorbing water some varieties thrive on arid plains. At the close of the season of 1900, the driest one of which the Weather Bureau has a record, trees of several species of eucalypts were observed growing without irrigation in Southern Arizona, and some of them had not been irrigated for many years. Trees of the red gum (*E. rostrata*), the sugar gum (*E. corynocalyx*), and of *E. tereticornis*, growing in a neglected tract under desert conditions where the ground water was about 100 feet below the surface, endured the above trying summer.

SCIENCE NOTES.

A second specimen of the African quadruped known as the okapi, discovered by Sir William Johnston, has been secured by Mr. Walter Rothschild for his extensive zoological museum at Tring (England). A special expedition was organized in Central Africa to secure a specimen from Congo Forest, dead or alive. That which has been received by Mr. Rothschild is the skin and skull of an adult okapi.

A Russian doctor named Loudon, of St. Petersburg, has published some interesting observations relative to the action of the Becquerel rays on the nervous system and on the eye. He found that when a box containing bromide of radium was placed in a cage in which mice were kept the animals became paralyzed and comatose, and died in five days. He also found that persons who are either totally blind, or have only the feeblest possible perception of light, are peculiarly sensitive to the Becquerel rays, and are able to form visual conceptions of the contour of objects the shadows of which are shown on a screen by means of the rays.

The Russian Naval Department some time ago dispatched Lieut. Bolsher, of the Imperial navy, to France, to study the question of the utilization of balloons for reconnoitering and other operations for naval purposes. Lieut. Bolsher has completed his investigations, and as the result of his observation he is to carry out a series of experiments as follows: Increase of the radius of action of wireless telegraphy by balloons; signals by balloons by day and by night; night reconnaissances by the aid of balloons; reconnaissances by the aid of free balloons; motion of free balloons at an angle of 70 deg. with the direction of the wind by means of the apparatus devised by M. François Hervé, which was employed so successfully in the Mediterranean; and lastly, measures to be adopted in connection with the ascent and descent of balloons by sea and land.

The French Admiralty has been carrying out a series of experiments to ascertain the effect of torpedo explosions in the proximity of, and from firing of torpedoes from, submarines. For these trials the submarine boat "Naïade" was employed. In the first test several sheep were placed in the vessel, which was submerged outside Cherbourg Harbor. A number of torpedoes were then exploded at distances varying from 90, 120 to 150 feet from the submarine. When examined the sheep were found to be apparently unaffected by the force of the concussion. The members of a special commission and the crew then embarked on the "Naïade," and fired torpedoes from the submarine at the target only some 180 feet away. The results were excellent, but the explosion of the torpedoes entailed a severe strain on the hull of the vessel. From these experiments it is concluded that firing at short ranges does not militate against the habitability or navigability of a submarine, and the results being more deadly, short range is to be preferred to long-distance firing.

A French botanist in the course of his explorations a few weeks ago in the sandy plains of the French Congo discovered a plant, the bark of the many radiating roots of which contained a large quantity of fibrous rubber. At the time scarcely any attention was paid to the discovery, but owing to the present scarcity of rubber and its high commercial value, which is in reality so prohibitive as to prevent a very wide employment of the substance, attempts are being made in England to turn this new discovery to commercial use. The plant also thrives profusely in northern Nigeria, and it is these forests which are to be exploited. A sample of the plant has been analyzed by the botanical authorities of Kew Gardens, London, and these investigations show that the rubber exists in the roots in sufficiently large quantities to warrant development. The name of the plant is *Landolphia Thrallonii*. It is to be found in many places on the west coast of Africa. One firm which is already engaged in the manufacture of this rubber is placing it upon the market at 75 cents per pound, and it is in every respect equal to the ordinary rubber.