Vista, Colorado. Mr. F. R. Marsh, of Denver, first called my attention to the fact that the roots of one of our native plants contained rubber, and kindly supplied me with material for experiments.

The roots tested were found to contain from five to twelve per cent. of crude rubber. This product is soluble in carbon bisulphide and benzol; it burns, giving off a strong odor of rubber. Several tests were made which showed that powder made from the bark contained a much larger per cent. than that made from the whole root. The crowns, when cleaned, contained about the same per cent. as the roots; the wool-like material surrounding the crowns contained a small per cent., though it was not so elastic as that taken from the roots and crowns.

The stems and leaves contained a resin soluble in carbon bisulphide, but it was a brown inelastic mass and when burned lacked the characteristic odor of rubber. The seeds contained a resin that superficially resembled that found in the stems.

It is hoped that the occurrence of rubber in the permanent parts of this *Picradenia* and not in the parts lasting only through the season may add to our knowledge as to the use of this substance. A detailed report on the physiological structure of these roots will be made as soon as fresh material can be obtained.

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BOTANICAL NOTES.

PROGRESS IN FORESTRY INSTRUCTION.

IT is but a few years since American university professors have given serious attention to that department of botany which deals with trees, *i. e.*, forestry, and it is a good sign of a broadening view of the work of the university and its relation to the community that not only are courses in forestry now offered by a considerable number of colleges and universities, but in addition their professors are writing books on the subject. Trees are no longer regarded by the botanist as mere species having place in a scientific system of classification, and on a definite portion of the earth's surface. These facts are important; fully as important as they have ever been, but we have learned that these giant plants have other interesting relations. We have found it as interesting to study the biology of a pine or an oak as of a microscopic alga or fungus. How to grow a tree is as legitimate a subject of inquiry as how to grow a particular bacterium or saprophytic fungus. The ecology of the forest affords as many interesting problems as the study of the zones and belts of ponds and swamps.

A little more than five years ago Professor Green, of the University of Minnesota, prepared a little book under the modest title of 'Forestry in Minnesota,' of which an edition of 10,000 was published by the Minnesota Forestry Association. After about three years, this edition being exhausted, Professor Green prepared a second which was published as a bulletin of the Geological and Natural History Survey of Minnesota. He has now revised the book again, enlarging and making it more general, so as to adapt it to the whole of the United States. Its title is now more general also—'Principles of American Forestry'—and it bears the imprint of John Wiley, of New York.

The scope of the book may be learned from an enumeration of the principal chapter headings, as follows: 'The Tree and Tree Growth'; 'The Forest'; 'Forest Influences'; 'Forest Regeneration'; 'Propagation'; 'Forest Protection'; 'Rate of Increase in Timber Trees'; 'Uses of Wood'; 'Durability'; 'Forest Economics'; 'The Important American Timber Trees'; etc.

A single quotation from the chapter on forest regeneration will suffice to show at once the style of treatment and the considerable botanical interest that this study involves, as presented in this admirable book:

> Succession of tree growth is an expression sometimes used as though there were a natural rotation of trees on the land. There is nothing of the sort. Sometimes hardwoods will follow pine, or the pine the hardwoods, where the two were mixed at the time of cutting, and there was a young growth of one or the other kind which had a chance to grow when its competitor was removed. Where land is severely burned after being cut over, the trees that show first are gen-

erally the kind with seeds that float long distances in the wind, such as poplar and birch, or those having fruits especially liked by birds, such as the bird cherry, which is very widely distributed. These show first on account of getting started first. The pine and the other trees may come in later owing to their being seeded later, or owing to the later advent of conditions favorable to their germination and growth. It may happen in the case of burnt-over pine lands that pine seed is distributed over it the first year after it is burned, but owing to there being no protection from the sun, the young seedlings of white and Norway pine, which are very delicate, are destroyed. After a young growth of poplars has appeared, the pine seed may find just the right conditions for growth for a few years, and finally get ahead of the poplars and crowd them out, while in the meantime it is being much improved by the presence of the poplars which grow rapidly and force the pines to make a tall growth. On the other hand, however, the poplars, birches and other trees and shrubs, and even weeds, may sometimes make so strong a growth as to kill out the young pine seedlings if they are not sufficiently well established at the time the mature growth is cut.

AN ENGLISH EDITION OF SCHIMPER'S PLANT GEOGRAPHY.

For several years it has been known that an English edition of Schimper's 'Plant Geography' was in preparation, the work having been undertaken by Professor William R. Fisher, with the advice and consent of the author. 'The untimely death of the author in 1901, shortly after the translation was begun, robbed the English edition of modifications and improvements which he had intended to make,' so the text of the book is exactly that of the German edition of 1898. The book in its English dress is characterized by the beautiful typography, paper and binding of the Clarendon Press of Oxford, and is a thick octavo of 869 pages (as against 894 in the German edition), and four maps. The only changes noticed are the omissions of the key-page to the plate of rock vegetation (Fig. 487), and the new plate for Map IV. at the end of the volume. The latter is much coarser in the Oxford map, and while it is much more distinct, it is considerably less accurate on the whole, than the German map. The translation has been revised and edited by Dr. Percy Groom and Professor Balfour, and Dr. Groom has added a sympathetic sketch of Schimper's life work.

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SCIENTIFIC NOTES AND NEWS.

At the annual meeting of the Royal Astronomical Society on February 12, Ambassador Choate received the society's gold medal on behalf of Professor George E. Hale, of the Yerkes Observatory.

McGill University has conferred the degree of D.Sc. on Professor D. P. Penhallow, professor of botany at the university, and on John A. Low Waddell, a consulting engineer of Kansas City.

Lord Rayleigh has been created, by the German Emperor, a foreign Knight of the Prussian Order Pour le Mérite for sciences and arts.

Mr. F. E. Beddard, F.R.S., of the London Zoological Gardens, has been elected a corresponding member of the Imperial Bohemian Academy of Sciences.

The following have accepted positions on the permanent staff of the Station for Experimental Evolution of the Carnegie Institution, at Cold Spring Harbor: Professor C. B. Davenport, who will serve as director; Mr. Frank E. Lutz, who will make quantitative studies in animal variation; Mr. George H. Shull, whose work will be largely in plant breeding and the study of mutations in nature; and Miss Anna M. Lutz, who will serve as recorder and cytologist. The plans of the new building are now in the hands of the architects, Messrs. Kirby, Petit and Green, of New York City, and construction will commence as soon as the frost is out of the ground, so that the building may be in use next summer.

Dr. Charles J. Chamberlain, of the Department of Botany of the University of Chicago, has received from the Botanical Society of America a grant to defray the expenses of a trip to Jalapa, Mexico, for the