SCIENCE.

FRIDAY, MARCH 4, 1887.

COMMENT AND CRITICISM.

PROF. C. S. SARGENT, director of the Arnold arboretum of Harvard college, takes occasion to reverse some of his earlier advice, in an article printed in a recent report of the Massachusetts state board of agriculture on the subject of tree-planting. He had been, like most American writers on forestry, strongly impressed with the value of foreign trees for general cultivation in New England; but as imported trees grow older they do not fulfil the promise of their earlier years, and he has therefore become convinced that natives are better suited to our climate and soil than any exotics can be. The willow alone, of all foreign introduced trees, has qualities not possessed in a greater degree by some native. The European oak is perhaps the most unsatisfactory deciduous tree that has been experimented upon: it grows rapidly when young, but fails, when about twenty years old, from the cracking of the main stem, and then, after dragging out a wretched existence a few years longer, miserably perishes. The Scotch pine is a failure in New England as an ornamental or a timber tree: it perishes long before reaching maturity, and the discovery of its worthlessness has cost American planters something in money and a great deal in disappointed hopes. The Austrian and the Corsican pine seem to be no better. The Norway spruce has been for many years the most widely cultivated foreign tree in Massachusetts: it is cheap, easily transplanted, and grows rapidly and gracefully when young; but the general introduction of this tree into our plantations must, nevertheless, be regarded as a public misfortune. It must be acknowledged to be a complete failure in eastern America: it will never produce timber here, and it is decrepit and unsightly just at that period of life when trees should become really handsome in full development.

These facts cannot be generally appreciated, for Professor Sargent estimates that five foreign trees are now planted to one native. But some progress in native sylviculture has been made in the south-eastern counties of Barnstable and Plymouth, where the farmers have learned how to plant and raise forests successfully and profitably. "It has been demonstrated in Barnstable county that a crop of pitch-pine can be raised from seed with as much certainty as a crop of corn, and with much less expense; and that the loose and shifting sands of Cape Cod, useless for every other purpose, can, with the aid of this tree, be made to bear valuable crops of wood." There are also plantations of white-pine, dug as seedlings in the woods, made forty or fifty years ago in the barren, sandy, exhausted soil of Middleborough and Bridgewater. The young trees were set out in shallow furrows at odd times with little expense, and required no subsequent care. Men are now living in these towns who have cut and sold white-pine saw-logs at the rate of $150 an acre, from seedlings set by themselves. These are no doubt the most successful and profitable attempts at sylviculture ever made in the United States; and, although the best methods of planting are not yet so fully understood as in the case of the pitch-pine, the experiments show that the white-pine, the most valuable trees in New England, can be cultivated with success and profit.

The supply of railroad-ties is a matter of growing importance for the New England farmer, and certain experiments made at the suggestion of Professor Sargent by the Boston and Providence railroad have an important bearing on it. Fifty-two ties were laid in December, 1878, on a track in Boston where the traffic is very heavy, having an average of sixty-five trains daily. Ten kinds of wood were tried, five in the natural state and five creosoted. None of the ties rotted, except one of the ailantus: the others that had to be removed had been injured by the hammering of the trains. Spruce, hemlock, larch, and southern pine have all suffered badly in this way. White-oak lasted well, but it holds the spikes so firmly that they cannot be drawn when the rails have to be shifted. Creosoted elm and birch did well, and are to be recommended. Chestnut was unfortunately not included in the experiment, although it is considered one of the best woods for ties. The behavior of the catalpa was one of the most interesting fea-

tures of the case: it has been highly spoken of for ties on account of its practical indestructibility when placed in the soil, and all the ties of this wood here tried are still sound, except just under the rails, where they are crushed nearly to pulp, so as to be of no service whatever for roads of heavy traffic.

IN A RECENT number of *Science* we noted some instances in which large employers had given favorable testimony to the action of profit-sharing in promoting good feeling and harmonious relations between employers and employees. The reverse side is presented very forcibly and clearly by Mr. Richard Aldrich in the *Quarterly journal of economics*. Mr. Aldrich points out that any system, such as profit-sharing or industrial partnership, which promises so momentous results, must be subjected to a most careful examination before receiving the stamp of approval. The inductive evidence so far obtained, he contends, is not sufficient, because the data included in it are so few, the whole number of instances collected not being more than one hundred, — a very minute speck in the whole world of business. Furthermore, the actual application of the system of profit-sharing has been so limited that the cases, from their very novelty, have often been surrounded by a set of special circumstances, and to eliminate the effect of these a large number of cases must be averaged. Induction being, for the present, inconclusive, it is necessary to turn to theoretical and *a priori* considerations. In applying these, in turn, profit-sharing must be viewed as a permanent and prevalent industrial system, and not as exceptional and experimental. Then the first consideration is that profit-sharing is unfair, in that it disturbs the natural working of wages and pays the employee twice over — his insured part of the product represented by wages, and a premium besides. The latter is taken from what should accrue to capital, and is over and above the commuted and fixed advanced share of the product, to which alone the employee is entitled.

Furthermore, profit-sharing implies some profits to share; but what happens, Mr. Aldrich asks, — and this is a point we have frequently emphasized in *Science*, — if instead of a profit there should be a loss? Logically, profit-sharing must and does imply loss-sharing. But this is impossible, and while capital is asked to share prosperity, it must shoulder adversity alone. It, of course, suggests itself that a reserve fund might be established in good years to be used in bad ones, but there are practical objections to this. In the first place, the stimulus to the employee which profit-sharing is supposed to furnish by holding out a prospect of immediate gain, is blunted by any claim on the gross profits other than the necessary ones of interest on capital, and profit on the same; and, secondly, the exact amount of the reserve fund would be difficult to determine. Another and a very forcible objection to profit-sharing is, that, in order to protect the employees, a full publication of the accounts of the business would be necessary. This would render business impossible. Secrecy in accounts is a most important element in the security and stability of any business, however sound. Mr. Aldrich develops all these considerations somewhat, and then mentions the very interesting and suggestive point, hitherto generally overlooked, that, because of the importance of the *entrepreneur* in the modern industrial system, the result of the widely-spread adoption of industrial partnerships would be to subordinate the pay of the laborer to the success of the capitalist who employs him. Where capital plays a subordinate part, where the functions of the *entrepreneur* are reduced to a minimum, there will industrial partnership be applied with greatest chance of success. But suppose, says Mr. Aldrich, that profit-sharing does all that is claimed for it by its advocates, and is introduced generally, in what respect will the situation of labor and capital be changed? The satisfactory results now attested to are due to the present exceptional character of the system. "The glamour and emotional interest which surround the experiments in industrial partnership have prevented any practical test from ever yet being made that would give the system an undoubted claim to be considered a solution of the 'labor problem.'"

THE DENTISTS OF MASSACHUSETTS are again endeavoring to secure a legislative act establishing a board of registration in dentistry. Such an act almost became a law several years ago, and seems to have failed because it was regarded by some as an infringement of the liberties and rights of the people, or on that small share of them who wished to practise dentistry without sufficient previous study. A broader view of the question would give chief consideration to the feelings of those

who are practised upon, and it is to be hoped that this view may now prevail. Twenty-seven of our states already have laws that close the profession of dentistry to men not properly fitted for it, so that Massachusetts has become, as it were, an asylum for the unskilled, and is already flooded with them, thereby working great hardship on the educated and capable members of the profession. Good reasons against such regulation as the Massachusetts legislature is now considering, are difficult to discover.

In the same line as this, but in a less advanced stage, is a move in Pennsylvania to allow the prescription of spectacles only to properly instructed oculists, and withhold it from opticians, whose duties end with supplying the glasses that have been prescribed. We could adduce here the same arguments that uphold the propriety of permitting none but physicians to prescribe medicines, while druggists may compound the medicines thus prescribed; while the objections to the proposition would come only from those who accept the not uncommon impression, encouraged by most opticians, that the choice of suitable glasses is not a difficult matter. This is true enough in many simple cases; but every oculist can quote examples of harmful effects following the use of lenses not adapted to the needs of the eyes. Few opticians have more than a mechanical training in their art, while the oculist should be a specialized physician. He and his patients deserve the same protection that is extended to other doctors and theirs.

BY THE WILL of the late Uriah A. Boyden, property, the present value of which exceeds two hundred and thirty thousand dollars, was left in trust for the purpose of astronomical research "at such an elevation as to be free, so far as practicable, from the impediments to accurate observations which occur in the observatories now existing, owing to atmospheric influences." The trustees of this fund have transferred the property to the President and fellows of Harvard college, in order that the researches proposed by Mr. Boyden may be directed at the Harvard college observatory. These researches will be supported by a portion of the means of the observatory, in addition to the trust-fund itself. The establishment and general management of the proposed mountain observatory will form a part of the work done at Cambridge, where also the observations made at the new station will in general be reduced and prepared for publication.

This donation opens a new field to astronomical activity. Heretofore the establishment of observatories has depended upon local or personal influences, which have usually confined them to the neighborhood of large cities, obviously not the best situation for astronomical work. The new observatory can be placed in what may appear, after sufficient inquiry and experiment, to be the best attainable location. Many obvious reasons suggest the selection of some place in the southern hemisphere. The southern heavens are still comparatively unknown, much as has been effected during the present century by the southern expeditions of astronomers from Europe and the United States, and by the gradual establishment of permanent observatories south of the equator. Moreover, if the present observatory of Harvard college is aided by a new station in the southern hemisphere, a scheme of work may be planned at Cambridge for the survey of the entire heavens upon a uniform plan. It is also probable that the stations combining the advantages of the greatest elevation with comparative ease of access and a climate not too severe may be found upon some southern mountains. Before the project can be executed, it will be necessary to obtain as much information as possible upon all geographical and climatic topics which may affect the establishment of the new observatory. All who have such information at command will accordingly be rendering a service to the cause of science by communicating it to the observatory of Harvard college.

THE INDIANA EARTHQUAKE.

THE U. S. geological survey has received information from about seventy towns within, and adjacent to, the area shaken by the earthquake of Feb. 6, 1887, in Indiana and Illinois. The accompanying map shows the derived isoseismal lines numbers 2 to 6 on the Rossi-Forel scale of intensity. The survey is greatly indebted to Prof. T. C. Mendenhall of Terre Haute for his courtesy in distributing printed letters of inquiry, and it is mainly from the replies to these letters that the data have been obtained. The only exact time-observation also was made by him with a seismoscope connected with a clock. The time he gives was $4^h\ 15^m\ 6^s$ reduced to the 90th meridian