

Autumn Colorations.

IN investigating this subject the first question is, What causes the variation in coloration? This may be answered by saying that it is a natural ripening of the leaf, a change in the coloring matter of the leaf called chlorophyl. One botanist has said: "The green matter in the tissue of a leaf is composed of two colors, red and blue. When the sap ceases to flow in the fall, and the natural growth of the tree ceases, oxidation of the tissue takes place. Under certain conditions, the green of the leaf changes to red; under different conditions, it takes on a yellow or brown tint. This difference in color is due to the difference in combination of the original constituents of the green tissue, and to the varying conditions of climate, exposure, and soil. A dry, cold climate produces more brilliant foliage than one that is damp and warm."

It is said by some who have visited England that in many places the ivy, so much cherished by the English people, is being replaced by our American ivy, *Ampelopsis quinquefolia*, although in that climate it does not take on as beautiful tints as it does in this country, but yet is far ahead of the English ivy. Another botanist, who has visited southern Germany and Switzerland, says that our American ivy is used very extensively in that country for decorating all sorts of buildings, and that the leaves take on more beautiful tints than he ever saw in this country. This may be partially due, however, to the contrast between the vine and the almost universally white color of the buildings in those river valleys.

We may conclude, then, that climate has much, but not all, to do with the variation in coloration for different plants of the same species in the same locality; in fact, different parts of the same plant vary in coloration. Just what makes this difference is an open question. It will be noticed that in many places where one leaf overlaps another that the under leaf is variable in color and that some are variable where they have not been thus immediately overlapped. So we see that in some respects it resembles the coloring of the skin of the apple. For, if an apple naturally red at maturity, is partially covered, the covered portion remains green. So far is this true that if a paper band is put around the apple before it begins to turn the skin will not color under the band. In this way a person can put his initials or his full name upon an apple. This might also be done with the leaf, but the covered portion would not remain green, and might be of the same shades as the exposed portion. This shows that the coloring of the leaf resembles, but is not identical with, that of the apple. The same may be said with reference to the grape. It has been proven time and again that the grape colors fully as well partially or completely covered as when exposed and, too, to just the same color. This is probably due to the fact that the grape skin itself is nearly transparent and the coloring matter is in the pulp immediately next it. The coloring of the leaf resembles these sorts of coloring more than it does the coloring of flowers. For, if a rose be naturally red, it is thought, I believe, that it will be brighter red when fully exposed.

Just here we might suggest that, by propagating from individual plants that bear very bright, highly-colored leaves, in a few generations it might be possible to get a tree the leaves of which would be much brighter than the one with which we started.

The general brightness of the coloring of the leaves probably depends largely upon the weather during the time of the ripening of the leaves. This present autumn of 1891 is a poor season for bright colorations in the vicinity of Columbus, Ohio, at least. This may be partially due to the dry weather late in September and early in October.

It would require careful observation on particular plants for a number of years to prove that the weather has the greatest influence. Two plants in particular may be noticed. One is a Japanese species of *Ampelopsis* on the west side of a brick building. Last autumn the leaves showed great variation in color, making the vine attractive, but this autumn the leaves turn brown and dry up on the vine, and are rather unsightly. The other is a small tree, generally known as "sweet gum," or "American liquid-amber" (*L. styraciflua*), standing in an exposed position. Last autumn the tree showed great variation in coloration, but this autumn nearly all the leaves turn a dull yellow or brown.

By referring to my diary, I find that in 1890, from Sept. 15 to Oct. 31, there are fifteen days where the weather is recorded as more or less rainy, namely, Sept. 26, 27, Oct. 4, 5, 11, 14, 15, 16, 25, 26, 28, 29, 30, 31; while for the same time in 1891 only seven days are recorded as more or less rainy, namely, Sept. 30, Oct. 4, 6, 14, 18, 19, 20. We may infer from this that wet weather makes bright colored leaves. Jack Frost probably plays his role, and the food of the plant in all probability is an agent in the matter. However, even this fall our trees and shrubs are affording us many specimens of Nature's handiwork worthy of the highest admiration. Dame Nature does not venture to denude all her trees and shrubs without making some to please the eye of man.

This leads us to the question, Is this all mere chance, or is it done for a purpose? In the case of the coloring of the fruits and flowers, it is evident that it is for the reproduction and distribution of the species. But in this case it can scarcely be for either of these purposes. If it is for the protection of birds or insects by resemblance, it serves its purpose very poorly indeed. However, let the cause be what it may, let the purpose be what it may, we always enjoy them, and thus they serve a purpose.

It is surprising how little attention our authors have given to this subject. They have found "sermons in stones and books in running brooks." Is there not enough of beauty in it to give a poet the inspiration, if that is what is wanting? One poet has said,—

"Heaped in the hollows of the grove,
The withered leaves lie dead;
They rustle to the eddying gust,
And to the rabbit's tread."

Longfellow's words are familiar to all:—

"The day is cold and dark and dreary;
It rains, and the wind is never weary.
The vine still clings to the mouldering wall,
And at every gust the dead leaves fall,
And the day is dark and dreary."

We do not find even an allusion to the beautiful coloring of the leaves no more than if they were always brown and sear.

Lastly, we might ask,—

How might not the trees have been made?
Intransplantable by shovel or spade,
Not one twig on a leafy bower,
Blooming in beauty or bearing a flower;
Not one leaf changing its hue
To blend so beautifully with heaven's own blue,
Not one form to please the eye
While towering upward toward the sky.

E. E. BOGUE.

Ohio State University, Columbus, O., Nov. 11.

Beech-Tree Struck by Lightning.

I SEND you an additional note on the beech-tree struck by lightning in July (*Science*, Aug. 11). The tree in question was one of a group of four beech trees and one ash tree, it was an old tree and only in half leaf at the time. It has since withered almost entirely. That it really was struck there can be no doubt, as I was sitting at a window within fifty yards of it, and I knew by the sound that something had been struck, as the report was sharp and sudden, not reverberating, and was simultaneous with the flash, and, upon going out immediately afterwards, I found the upper part of the trunk and branches freshly bared and the bark strewn at the foot of the tree.

T. D.

York, England.

The Crescent Moon with a Star within its Rim.

THERE is one passage in the poem of the "Ancient Mariner" which had always been a puzzle to me until a few years ago, when I observed a phenomenon which I think supplies a satisfactory explanation of the meaning of the author. The lines referred to are those in which the crescent moon is described as having a star within its rim. I was in the south of England at the time, and the phenomenon which I saw was as follows: One clear evening,

when the moon was in the first quarter, I observed a bright spot resembling a small star or planet upon the shaded surface of the moon at a considerable distance from the illuminated portion of the satellite. This I have no doubt was due to the beams of the sun being reflected from the summit of one of the higher peaks before they had illuminated the surrounding country. I have no doubt the passage in question was suggested to the mind of the author by his having been witness of some similar phenomenon, although I have never heard of it being visible to the unaided eye.

T. D.

York, England.

BOOK-REVIEWS.

Masterpieces of American Literature, with Biographical Sketches.
Boston, Houghton, Mifflin, & Co. 12°.

THIS book was prepared at the suggestion of the Boston school authorities, and is designed both as a reading book and as an introduction to American literature. The authors represented are thirteen in number, including Franklin, Irving, Whittier, Lowell, and others, and the selections embrace a variety of articles in many departments of literature, both in prose and in verse. The selections are longer than those in ordinary reading books, the whole of Whittier's "Snowbound," for instance, being given, while other authors are represented either by entire works or by long extracts. It is stated in the preface that the Boston school authorities "planned the book and approved every selection;" but, if they did, we cannot think they are to be wholly commended as judges of literature. The book contains too many doggerel verses, while, on the other hand, it presents some striking deficiencies. For instance, there is not in the whole book a single extract from our historians, although it is well known that we have better works to show in history than in any other department of literature. Moreover, there is not a religious article in the book, and very few that are even ethical; so that the collection cannot be regarded as a satisfactory epitome of the best American literature. The omissions are the more to be regretted because ethical and historical works are especially adapted for the instruction of the young. American literature is but a narrow field at best, and gleaners in it cannot afford to neglect any portion of it, least of all that portion from which the most useful moral lessons may be learned. We hope, therefore, that, if ever the book reaches a second edition, some changes will be made in its contents.

AMONG THE PUBLISHERS.

— The third edition of "Electricity, treated Experimentally for the Use of Schools and Students," by Linnaeus Cumming, has been published by Messrs. Longmans, Green, & Co. The author has made such additions and alterations as seemed necessary to bring the book up to date.

— John Wiley & Sons have in preparation a "Manual of Experimental Engineering," by Professor R. C. Carpenter of Sib'ey College.

— Moses King of Boston, the maker of hand-books on various cities, now announces a new work, to be called "King's Hand-book of New York City."

— Messrs. Whittaker & Co. have in the press a second edition of Dr. A. B. Griffith's "Treatise on Manures." It is a little more than two years since the work appeared. Fifty pages of new matter have been added.

— The January number of *Scribner's Magazine* marks the beginning of the sixth year and eleventh volume of a periodical which has already attained a circulation of more than 140,000 copies monthly.

— D. Appleton & Co. have under way a subscription-book of considerable importance, edited by Professor Shaler of Harvard. It is to be a general review of the America of to-day based upon the reports of the last census. The contributions to this volume

will be by experts and men of high standing in the profession for which they speak.

— The next volumes of Swan, Sonnenschein, & Co's Social Science Series will be "Poverty, Its Genesis and Exodus," by J. G. Godard, and "The Trade Policy of Imperial Federation," by Maurice H. Harvey, who lately wrote an article on the subject in the *Asiatic Quarterly Review*. A translation of the new book of M. Ostrogovski, "La Femme au Point de Vue du Droit Publique," is to appear in the same series at an early date.

— D. C. Heath & Co., Boston, will soon issue the first four books of "Dichtung und Wahrheit," edited for them, with introduction and notes, by Professor C. A. Buchheim, editor of the Clarendon Press Series of German Classics. The edition will be especially adapted for pupils preparing for entrance to college, offering an advanced requirement in German, but will also have in view the numerous colleges that devote a portion of their time to the reading of Goethe's prose.

— The frequent reports that Russia is about to seize Bokhara will lend interest to the article by the Rev. Henry Lansdell, D.D., in the January *Scribner*, entitled "Bokhara Revisited." In this article he says: "It was not the policy of the Resident to interfere more than is necessary in the domestic affairs of the Khanate, except when they related to Russian subjects; and as for annexing the Khanate, 'why,' as one asked of me, 'should they do that?' To administer the country in Muscovite fashion would cost a great deal more than the taxes would pay for, and if the Russians want anything done, they have simply to nod to the Emir and he does it. They are much too wise, therefore, to annex Bokhara, but if need arises it can of course be done at any moment."

— *The Chautauquan* for January presents the following among other articles in its table of contents: Domestic and Social Life of the Colonists, IV., by Edward Everett Hale; Trading Companies, by John H. Finley; Physical Life, IV., by Milton J. Greenman; National Agencies for Scientific Research, IV., by Major J. W. Powell; Science and the Feeding of Animals, by V. Hallenbeck; Progress in the Nineteenth Century, by Edward A. Freeman; Some Propositions of Nationalism, by Edward Arden; Niagara the Motor for the World's Fair, by Professor John Trowbridge; The Kindergarten Movement in Chicago, by Antoinette Van Hoesen Wakeman; How Women Figure in the Eleventh Census, by Margaret N. Wishard; Women's Robes in the Orient, by Countess Annie de Montaigne.

— The American Academy of Political and Social Science has just published an essay on "Some Neglected Points in the Theory of Socialism." The author is T. B. Veblen of Ithaca. The monograph was written with the purpose of finding an economic ground for the existing unrest that finds expression in the demands of Socialists. The work is a criticism of Mr. Spencer's essay, "From Freedom to Bondage," and though Mr. Veblen claims to be rather a disciple than a critic of Mr. Spencer, he hardly proves himself such. The author shows very clearly how, under our present system, there is a constant effort even at the expense of real physical comforts and even necessities to make a greater display of one's ability to pay than one's neighbors. This "Economic Emulation" he regards as the chief underlying cause of the present socialistic agitation.

— The success of *The Atlantic Monthly* in certain departments during the last year or two will be continued during the year 1892, as shown by the following announcements. All the attractions which it will contain cannot, however, be mentioned here. The papers on marked men will include articles on George Bancroft, by W. M. Sloane; Orestes A. Brownson, by George Parsons Lathrop; John Esten Cooke, and Philip Pendleton Cooke, by Thomas Nelson Page; and James B. Eads, and others, will be continued. "An American at Home in Europe" is a series of papers by William Henry Bishop, the novelist, giving the experience of an American family which established itself abroad. Mr. Bishop tells about his experiences in daily living in Paris, Versailles, St.