they bore what seemed to me and my associates to be incontrovertible evidence of the immediate effect of cross-pollination. I had never before been convinced that such immediate effect in flavor and other varietal characteristics can occur in the apple, but I am now satisfied that it may occur; but, like heredity of mutilations, it is certainly rare and therefore apparently exceptional.

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SCIENTIFIC LITERATURE.

The Florentine Painters of the Renaissance with an Index to their Works. Bernhard Berenson. New York, G. P. Putnam's Sons. 1896. Pp. 141.

This little handbook, by an accomplished student of art history, deserves notice in these pages because it is the first attempt we have seen to apply elementary psychological categories to the interpretation of higher works of art. A painting, says the author, is of only two dimensions and yet must suggest the third dimension to the spectator's mind. The artist to do this, must give *tactile values* to retinal impressions. "It follows that the essential in the art of painting * * * is somehow to stimulate our consciousness of tactile values, so that the picture shall have at least as much power as the object represented, to appeal to our tactile imagination." From Giotto onwards, the Florentine painters preeminently did this, so that the phrase 'tactile value,' instead of the more familiar word 'form;' appears on every page of Mr. Berenson's account of their characteristics. The high pleasure derived from tactile values artfully portrayed would seem to be due to the rapidity and intensity with which they are suggested. The tactile aspect of reality is actually 'heightened' by the picture, and thereupon ensues the secondary enjoyment of our own capacity for the enhanced experience. The rendering of movement is a step farther in the same direction; we feel the motor life of the figure in ourselves and a heightened sense of our own capacity results. To say that pictures have a 'life-communicating value' is thus to sum up the explanation of their effect on us from this point of view.

The essay is charmingly written, and will be useful to all art-students. Whether we get much deeper into the secrets of art-magic, or account for the sense of preciousness that some paintings diffuse, much better on Mr. Berenson's terms than on more familiar ones, may be left an open question. Mr. Berenson himself has to add 'spiritual significance' to his other terms of 'life-enhancing value.' But until we can define just what the superior 'significances' are, in the better of two good pictures—and surely we hardly ever can—the explanation of all merit by significance remains somewhat unsatisfying. The better picture remains simply the better picture, and its ultimate superiority might, in the end, be a matter of immediate optical feeling and not a matter of extraneous suggestion or significance at all.

W. James.

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Atlas of Nerve-cells. By M. Allen Starr, with the cooperation of Oliver S. Strong and Edward Leaming. LIII. Plates, 13 diagrams, pp. 79, 4to. Macmillan & Co., 66 Fifth Avenue, New York. 1896. Price, $10.

This latest volume from the University press of Columbia University contains much more than the preface indicates.

A short preface serves to explain the nomenclature employed. The nerve cell is designated as a neuron. It has protoplasmic branches as dendrites and the pin-head enlargements along the surface of the dendrites as gemmules. The axis cylinder process is termed the neuraxon; its branches, collaterals; and the terminations of these branches, end brushes. Immediately following the preface is a valuable description of the silver method of impregnation by Dr. Strong, recounting the manner of preparing the sections here employed for the plates, and explaining the modifications in technique which he has introduced with such good results. Upon the photographic methods employed, Dr. Leaming adds a chapter which will materially assist those who propose to work along similar lines.

The body of the book follows and contains LIII. plates, which are reproductions of photomicrographs, and thirteen diagrams, together with the corresponding text. The sections have

been made largely from human material. The nerve cells of the cord and spinal ganglia, and those of the cerebellum, quadigemina, thalami, striata and cerebral cortex, are represented and described in the order named. At the very end there is given a plate from Hammarberg illustrating the size and distributions of the nerve cells in six localities of the human cortex.

In the description of the plates cell structure is disregarded, because all structure is obliterated by the silver method, and attention is therefore given alone to the shape and size of the cell bodies and to the number, direction, form and terminations of their branches. The description of the plates forms but a fraction of the text, the remainder of which is a running account, by Dr. Starr, of the architecture of the parts named.

This lucid and terse account is purposely dogmatic and is well illustrated by the diagrams, many of which are essentially new.

Moreover, the teachings of the plates are used where the silver method has enlarged our notions of the architecture, and thus the plates are made contributory to the more general narrative. The double character of the connections between the different cell groups in the central system is one of the more important points which is emphasized throughout.

Turning to the plates themselves, which in the stricter sense compose the *Atlas*, the question is as to what is gained by the photographic representation of the sections. Our impression of a microscopic section is usually based on several pictures offered to the eye at different depths within the object, for such sections always have an appreciable thickness, and only one level can be brought in focus at a time.

Photo-micrographs necessarily give a picture of but one of these levels, and the rest of the specimen is out of focus. The picture thereby obtained is independent of the draughtsman's bias and rigidly accurate, exactly what is desired. Thus, in this case the plates show to perfection the cell bodies and the larger branches, which were accurately focused. On the other hand, the connection of the neuraxon with the cell body is often lost, for it not uncommonly passes out of focus just at the point of junction. So, too, the mass of dendrites, especially where most abundant, as in Purkinje's cells, is of necessity inadequately shown, and the proper relation of the end brushes to the dendrites is obscured.

If the draughtsman is in danger of too great completeness in his drawing the photo-micrograph suffers from a lack of this quality and shows far less than the specimens themselves. By this method therefore accuracy is gained at the price of limitation.

This criticism is intended for the benefit of those who at first sight may feel a disappointment that the whole matter is not entirely cleared up by photographic treatment. A reading glass can be used with advantage in the study of these plates, and, above all, they require careful scrutiny to be appreciated. The silver method is notoriously fickle, and it needs more than the usual skill and perseverance to obtain results by means of it; hence an atlas with good plates cannot fail to be useful to many persons and in many ways; and accompanied, as this one is, by a most instructive text, there can be no question of our indebtedness to the authors for their contribution to neurology.

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Die Insel Tenerife. Von DR. HANS MEYER. Leipzig, S. Hirzel. 1896. 8vo, pp. VI., 328. Four maps and 33 illustrations.

The book before us makes good its claim as a scientific guide book to a most interesting region. Humboldt and many other well-known men have given us their estimate of these famous islands. The peak of Tenerife, from its beautiful form and location, has been a favorite theme even from the most ancient times, when the virtues and charms of the 'Fortunate Islands' were proclaimed by bards and philosophers.

The work, however, like many such attempts, while it is not technical enough for the scientist, has a decided advantage over a mere traveller's day book in that a great deal of scientific information of an accurate character and in an easily comprehended form is given in a pleasant and popular style. The origin of the early inhabitants as well as the fauna and flora are carefully treated, and while some vexed ques-