But a more important question to determine, and one about which much less is definitely known, is the height at which these night-flying birds migrate. Both Messrs. Scott and Young, and Mr. Tatlock and myself, solved this problem by a hypothetical assumption of the inferior and superior distances at which a bird would be visible. In this way we arrive at the conclusion that the birds seen were between one and three miles above the earth. There is much confirmatory evidence of the truth of this supposition. For instance, Mr. R. A. Bray records in *Nature* (Vol. 52, p. 415) a flight of birds observed by him through a telescope directed toward the sun, at 3 p. m., on September 30, 1894, at Shere, Guilford, England. The birds were invisible to the naked eye, but must have been at least two or three miles away, as both birds and sun were in focus.

Additional observations are needed, however, before this matter can be considered as satisfactorily settled. If, by experiments made during the day, the observer can ascertain with exactness the lesser and greater distances at which a bird would be visible through a glass focused on the moon, and the appearance of a bird at a known distance, he would then have established some basis for comparison of the observations made at night.

It is also of importance to note the time occupied by the bird in crossing the moon's face. This varies greatly; some birds appearing as a mere flash of wings, while others are silhouetted against the moon with great distinctness, and are in the field for several seconds.

Assuming that small birds migrate at the rate of about forty miles an hour, and that they pass through the field at right angles to the line of vision, we have here a means of determining approximately the width of the angle at their point of crossing and consequently, in connection with the moon's elevation, their height above the earth.

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CURIOUS FREAK IN AN APPLE TREE.

SOME very curious apples were found last year in an orchard about a mile north of Lake Erie. The apples on the northeast side of a certain tree were Rhode Island Greenings, such as the tree had always borne, while those on the southwest half of the tree were of a mixed character, each apple being partly Greening and partly Talman Sweet.

The different kinds occurred in sections, for the most part corresponding to the carpels. In some, three sections or three-fifths were Greening and two-fifths Talman Sweet, while in others the proportions were reversed. In others one-fifth was Greening or Talman Sweet, and in others again the proportion of Talman Sweet was still less.

The different parts were in most cases easily distinguished by color and by the greater protuberance of the Greening as forming part of a larger apple. The flavor of the parts was as purely Greening or Talman Sweet as if they had belonged to separate apples on separate trees, except where the two came together.

The line of demarkation between the parts, though not very definite, corresponded in most cases with the divisions between carpels, and ran from base to summit, except that a small part round the summit seemed in all cases to be Greening. Sometimes a portion of Talman Sweet was found wedged in at the base of a segment, extending only about half way to the summit.

A short distance to the southwest of this tree stands a Talman Sweet tree; and there can be no reasonable doubt that the phenomenon arose from cross-fertilization between the pollen of the Talman Sweet and the ovule of the Greening. It is difficult, however, to see why the pollen, which acts directly upon the ovule, should so profoundly affect the receptacle and calyx, which make up the fleshy part of the apple. Equally difficult is it to understand why cross-fertilization, which must frequently occur in apple trees, should in one instance produce mixed fruits, and in a thousand cases produce no appreciable effect whatever. Perhaps some of the readers of SCIENCE can throw light upon the subject.

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I HAD the privilege of examining samples of the apples of which Mr. Lennox writes, and

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.

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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