

tively rare. The Mesozoic and Tertiary rocks, however, are rich in silicified and other petrified woods, many of which belong to the coniferous genera. The determination of these woods is a particularly difficult branch of palæontological research, demanding great patience and knowledge of the finer points of plant structure. Wood determinations are often—indeed generally—neglected, owing to the difficulty of mastering the technique; but, as Prof. Seward truly says, “the student cannot afford to neglect this line of inquiry if he desires to obtain a comprehensive view” of the essentials of palæontological plant history. In the present volume a considerable proportion of the space is allotted to the careful and critical consideration of the species based on secondary wood.

The terminology of this section is not entirely that adopted by other leading workers in this field, but tends perhaps to simpler grouping of the subject by the elimination of certain “genera” which are based on distinctions too subtle for secure determination, such, for instance, as the *Phyllocladoxylon* of Gothan. The elimination of doubtful genera, principally those which have names suggestive of affinities remote from those with which they properly are really to be associated, on the whole tends towards the clarifying of the science.

In conclusion, one can only urge every geologist and every botanist not only to possess himself of Prof. Seward's text-book, but also to acquaint himself with its contents.

The Nature of Musical Sound.

The Foundations of Music. By Dr. Henry J. Watt. Pp. xvi + 239. (Cambridge: At the University Press, 1919.) Price 18s. net.

THE author unfolds a new theory to account for the fact that certain combinations of sound, called concords, are “pleasant,” while others, called discords, are “unpleasant.” In place of the ancient theory by which the “harmony of numbers” in the sense of proportions of string-length to pitch has dominated these questions since the days of Pythagoras, he considers that sound possesses “volume,” an attribute somewhat difficult to grasp at first sight. So far as we can understand the new theory, the volume of a low sound contains within itself the volumes of all sounds higher than itself; the proportions of the various volumes coincide with the well-known proportions of those of pitch. Hence the volume of the sound represented by C is exactly double that of the next C above it, and the volume of G, lying between the two, is two-thirds that of the lower C.

As the lesser volume is contained in the greater, there is “fusion” of volume when two sounds are heard together. This fusion being complete in the octave, the two sounds coalesce to such an extent as sometimes to be heard as one sound. We are to understand, then (so far as we can make out), that the octave is the “pleasantest” interval. Next come fifths and thirds as pleasant intervals; and the discords, the volumes of which do not fuse with the root volume, are classified as “unpleasant” (pp. 24 *et seq.*), or words to that effect. We confess that this theory is so novel that we find it hard to grasp. To the musician a discord is not an “unpleasant” part of his raw material; it is simply a chord that requires to be “resolved” into a succeeding chord. It has, therefore, the element of motion, while the concord suggests repose.

The theory of fusion raises the ancient question of the prohibition of consecutive fifths and octaves. The author discusses at great length all the well-known attempts at explanation, and adds his own. Probably the prohibitions are merely conventions, as suggested by Cyril Scott, quoted in a footnote on p. 132. In the tenth century Hucbald says of the ancient organum of his day: “If sung with suitable slowness, you will see that it produces a sweet concord.” The present reviewer, wishing to scoff at the notion that successions of fifths and octaves could “produce a sweet concord,” asked the choir of the Plainsong Society to sing a specimen of tenth-century organum. To his and their surprise they found Hucbald entirely vindicated. And Dr. Watt shows (p. 84) that Gevaert, making a similar experiment at Ghent in 1871, found exactly the same result: “The impression made on the audience was profound.”

The only example Dr. Watt gives in musical notation (p. 120) is a series of consecutive fifths by Karg-Elert, played very slowly on the softest organ stop. He offers an explanation of its “beauty”; we think, however, that the same passage, if sung or played rapidly and loudly, would be anything but beautiful.

Dr. Watt revives the old controversy as to whether the interval of the fourth is a concord or discord. We thought that musicians had long settled that the fourth from the bass, since it requires resolution, is a discord, while the fourth from any other voice is a concord, since it does not require to move.

The book ends with chapters on “The Objectivity of Beauty” and “Æsthetics as a Pure Science.” To those wishing to investigate the nature of sound, its new outlook should prove interesting.