

BIRKHOFF ON AESTHETIC MEASURE

Aesthetic Measure. By George D. Birkhoff. Cambridge, Harvard University Press, 1933. xvi+226 pp., 23 plates, 10 in color. \$7.50.

Every reader of this Bulletin will find this work thought-provoking. Its first appeal is to the analytically-minded aesthetician; but there are questions and implications far beyond any specialist's domain. The reviewer will therefore examine *Aesthetic Measure*, firstly, as to how well it solves its self-imposed problem, and, secondly, as to the relevance of its contribution to aesthetics, this term being used in its broadest sense.

In Chapter 1, Professor Birkhoff presents the following mathematical formulation of the fundamental problem: "Within each class of aesthetic objects, to define the order O and the complexity C so that their ratio $M = O/C$ yields the aesthetic measure of any object in the class." In subsequent chapters, this problem is solved for various simple classes of aesthetic objects in great detail. The author distinguishes between "formal" and "connotative" associations, and explains that "our attention will be directed almost exclusively toward the formal side of art, to which alone the basic formula of aesthetic measure can be quantitatively applied," but with "no intention of denying the transcendent importance of the connotative side in all creative art."

In Chapters 2, 3, and 4, the author elaborately applies his theory to polygonal forms, ornaments and tilings, and vases—that is, to the more elementary fields. The reader stands amazed at the author's thoroughness. Here minor criticisms are beside the point; for the author does seem to establish the validity of his formula. In Chapter 2, there is recorded the aesthetic measure of 90 polygonal forms, pictured in colored plates. In Chapter 3, five interesting full-page plates illustrate species of one- and two-dimensional ornaments. But the discussion preliminary to application of the theory, though a neat piece of analysis, is sufficiently mathematical to become formidable reading. In Chapter 4, we meet a difficulty. That the theory "here is to be regarded as more questionable than the theories of polygons and ornaments" suggests that the more abstract vase form has higher expressiveness. And we sense trouble ahead in dealing with an art so abstract as music. The author himself concedes, in closing the chapter on vases: "It is an interesting question as to how the explicit knowledge that these simple relations exist in a given case affects the aesthetic judgment. In my opinion, the effect is slightly adverse, for, in all fields of art, it is the intuitively felt relationships which are the most enjoyed."

In Chapters 5, 6, and 7, we come to music. In these chapters on chords, harmony, and melody, we recognize the author's perseverance in acquainting himself with the many technical matters involved and his patience in enumeration. We gain the impression that the author, willing to admit the "almost transcendental expressive power" of music and its "deep and almost universal appeal," has yet a tendency to pass lightly over certain features which, although irrelevant for him, are, for many, vital. There is a wide-spread conviction that an art-work is significant because of what it "means" rather than what it "says." We hold, with Birkhoff, that Gurney's point of view—that

music is Ideal Motion, whose "essential characteristic . . . is an absolutely unique beauty perceived by an absolutely unique faculty . . ."— is hardly tenable. Yet must a science of aesthetics necessarily be analytical in the sense of Birkhoff to be other than mystical?

The chapters on harmony and melody present, it is true, a valid formula. But what, precisely, is its significance for aesthetics? We find merely a rationalization of rules previously discerned through a study of the masters—and made conveniently accessible by Prout's *Harmony* and *Counterpoint*. It is only natural that the theory should turn out to be both necessary and sufficient: the author finds that no good melody can have a low M , and that no poor melody can have a high M .

Now to some aestheticians, formal structure explains the whole power of music. For the musician, however, the major emphasis is elsewhere. The musically receptive and discriminative listener requires knowledge neither of musical theory nor of aesthetic measure. His query as to the formal is merely: shall it be subjected to rational or to intuitive analysis?

In these chapters, it would not be difficult for the theoretician to propound some interesting questions. For example, on page 148, in assigning $M=15$ to the fifth chord sequence in the first brace, and $M=16$ to the eighth in the second brace, does not the author overlook vital elements in musical significance? And how about rests? Every reader of musical material, from either the creative or the analytical side, has heard that "it is easy to write notes but hard to write rests"—a remark generally attributed to Mozart. Any analysis which does not take into account the soul-stirring effect of measures of rest in the first movements of Beethoven's Fifth Symphony and Mozart's G Minor Symphony, can hardly escape classification as inadequate even from an elementary standpoint.

Birkhoff's analysis of the formal factors in poetry (Chapter 8) renews interest in the ever-burning question as to the relative merits of views held by various schools. Birkhoff says that "the fundamental aim is always to achieve the terse, imaginative expression of the poetic idea in metric form by use of language of unusual musical quality." In contrast with this notion stands Professor Housman's* definition of poetry: "I think that to transfuse emotion—not to transmit thought, but to set up in the reader's sense a vibration corresponding to what was felt by the writer—is the peculiar function of poetry." Housman considers poetry "more physical than intellectual," but maintains that "the majority of mankind notoriously and indisputably do not . . . possess the organ by which poetry is perceived." In short, although poetry is not so abstract and powerful a medium of expression as music, the vital aim is that of music: to stir our feelings through voicing them; and the crucial test is how deeply we are stirred! Moreover, in poetry, as in music, the highest desideratum is that perfect unification of form and content for which all art strives; and if we are concerned with what poetry is rather than with what it is about, it is doubtful how much any analysis, of factors abstractly separated, can contribute to our understanding of the fused whole, where the synthesis is so subtle as virtually to defy analysis. We are driven again to query whether the

* A. E. Housman, *The Name and the Nature of Poetry*, Macmillan, 1933.

meaning of art is so much the information it conveys as what it imparts by way of power to apprehend and evaluate experience.

The author's appraisals are found in the two concluding chapters, on *Earlier Aesthetic Theories* and on *Art and Aesthetics*. The contributions of earlier writers, beginning with Plato and Aristotle, are interpreted in terms of the quantitative theory. To the author "it seems almost obvious that aesthetics, if it is to be scientific, must be approached from the analytic point of view and must concern itself chiefly with the formal aspects of art." Thus, when Birkhoff comes to Croce, for whom art is the "expression of impressions" and "lyrical intuition," he observes: "Such general philosophical definitions and classifications, however true, can never serve as the point of departure for a science of aesthetics. They are self-limited and form a kind of philosophic citadel from which an attack upon any and all more definite conclusions can be conveniently made."

Now the science of aesthetics envisaged by Vico, and later brought to flower by Croce, excludes by its very nature the type of analysis favored by Birkhoff. But this does not mean that Vico or Croce have offered us a mystical theory, or something vague in outline or content. To the reviewer it has always seemed that Croce, in his *Aesthetic*, penetrates toward the real heart of the matter. He argues ably for a science of intuitive knowledge comparable in importance to a science of intellectual knowledge, and stresses the fact that: "The difference between a scientific work and a work of art, that is, between an intellectual and an intuitive fact, lies in the difference of the total effect aimed at by their respective authors. This it is that determines and rules over the several parts of each, not these parts separated and considered abstractly in themselves."

In this chapter, the author also quotes, in part, two paragraphs from the end of Helmholtz's monumental work on *Sensations of Tone*. Birkhoff, although he finds no indication of the quantitative outlook, concludes that Helmholtz adheres to the general analytic point of view; for the latter says: "No doubt is now entertained that beauty is subject to laws and rules dependent on the nature of human intelligence . . ." But, as we read the chapter from which Birkhoff quotes, it seems to us that Helmholtz distinctly subordinates the analytic point of view; indeed, he says: "It is precisely from that part of its regular subjection to reason which escapes our conscious apprehension that a work of art exalts and delights us, and that the chief effects of the artistically beautiful proceed, *not* from the part which we are able fully to analyze." And Helmholtz decides not "to proceed further into the esthetics of music . . . The real difficulty would lie in the development of the psychical motives which here assert themselves. Certainly this is the point where the most interesting part of musical esthetics begins, the aim being to explain the wonders of great works of art, and to learn the utterances and actions of the various affections of the mind."

In the concluding chapter, Birkhoff indicates very briefly how application of his theory may be made, in decorative design, painting, sculpture, architecture, and music, to include the qualitative aspects of form. It is shown that certain well known maxims—embodied in the principle of "unity in variety"—are contained implicitly in the basic formula. But if these maxims have been the point of departure for formalism ever since antiquity, does not the author

here expose himself to the criticisms levelled at the formalists? After some remarks on evolution of art and on creative art, the chapter, and therewith the book, closes with a description—far from convincing to us—of the services which the author believes his theory capable of performing both in the aesthetic experience and in the creative process.

As we lay aside *Aesthetic Measure*, our first thought is that, for an estimate of its relevance, we should view it against a sufficiently broad philosophic background. The complete picture must embrace not only man's intuitive and conceptual activities, but also his practical activities, economic and ethical.

We affirm that the intuitive and the conceptual are indisputably distinct. Yet may there not be some parity connecting such representative theoretical activities as music and mathematics? If found, this parity should throw into even sharper relief the difference between the intuitive and the conceptual—by revealing to us more clearly those aspects in which the two are not comparable.

The reviewer's contention is that the parity we seek is to be found in the striking parallelism between, on the one hand, the manner in which mathematics, through correspondence, "functions" with formal or quantitative aspects of the concrete to extend our range of conceptual knowledge, and, on the other hand, the manner in which music, through association, "functions" with connotative or affective aspects of the concrete to enlarge our sphere of intuitive knowledge. Here "function" refers to the interplay between the real and the ideal. Thus, on Dewey's view, both art and science would appear as controls for progress; to Santayana, both music and mathematics would glory in being wholly free and yet useful. We cannot pass, in the sense of establishing identical correspondences, from any one realm to another; yet, through comparison and suggestion, we are able to obtain ever-increasing knowledge of ourselves and of our physical surroundings. We dare to opine that this functional dependence of progress on activities both theoretical and practical has virtually the same characteristics whether in the domain of the intuitive or the conceptual. It must be left to the reader to realize the parity we have conjectured and the force of its implications. Our own inference from the generalization just advanced is that, until we totally separate music and mathematics, art and science, and proceed on the basis of their parity, we shall not be making headway.

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