

almost any recent Hindemith work. It defies consistent analysis—being at various times atonal, polytonic, polytonal, even conventionally diatonic—yet it maintains a logic, however obscure, and always gives off the feeling of being completely realized. Rhythmically the music is less complicated than other works (*Klaviermusik*, opus 37, for instance), since there are voices to be accompanied; still, it would be a considerable exaggeration to say that the rhythms are simple or usual. The melody-line varies constantly; sometimes it is found in the voices, sometimes in the woodwinds (there is a charming *Ariette* for saxophone and Hélène's voice, elaborately florid on the words "froh und früh," accompanied by light staccato chords at the extreme treble and bass of the two pianos). Sometimes the brass comes in for the solo line, as in the glissando melody played by the trombone at the entrance of the doctor. Most striking in this little masterpiece is the economy of its means, the richness and variety of effect and the characteristic unity.

The Philadelphia Society also repeated the League of Composers' earlier performance of *L'Histoire du Soldat*, acrid and teeming music, whose texture is deliberately thin and fragmentary, achieving thereby an ultimate satisfaction undreamed of before the advent of Stravinsky. The same program included the ballet, *Vibrations*, by Isadore Freed, vague and reminiscent dance-music, well written, pleasantly danced, easily forgotten.

Marc Blitzstein

THE CASE FOR A MUSIC LABORATORY

JOHN Redfield's book, *Music: A Science and an Art*, just issued by Alfred A. Knopf, is, to say the least, provocative. Whether or not one agrees with his theses and speculations, they undeniably set many ideas in motion. Though it is not intended as a treatise on the science and art of music, and demands of the reader no specialized training, the volume contains information for the musician who should know more about the science of music, and perhaps for the physicist who could know more about the art.

Mr. Redfield was lecturer in the physics of music at Columbia University and this book is the result of his work there, plus many

earlier years of investigation and experiment. His general point of departure is that music, as one of the arts dependent in its development on that of an underlying science, is far behind surgery, for example, photography or stage illumination in the recognition and study given to the science on which each rests. For him the study of the physical things used as vehicles of expression in musical art constitutes musical science. Instruments are pieces of physical apparatus subject to the physical laws governing other machines. Composers must also work with such physical material as rhythm and musical notes, "atmospheric phenomena as truly physical in character as electricity, heat or gravitation; and both of them quite as properly subjects for laboratory investigation as any of the latter phenomena."

His most interesting and valuable suggestion, perhaps, is for the establishment of a musical laboratory which should be the central feature of a school of music. Little research has been done in the field of sound, yet "sound is the raw material out of which the musician fashions the finished product called music. . . . But as compared with other manufacturers the musician assumes a very surprising attitude. Other manufacturers find it advantageous to study their raw material. If something is wrong with their finished product, they know that the fault must lie either with their manufacturing processes or with the material they are using. . . . They find it necessary, therefore, to know all about the material. . . . Not so our musician manufacturer. . . . All he needs to know is how to turn out the finished product. To be sure things sometimes turn out badly, but it never occurs to him that there is anything to be gained by a study of sound."

The work of Mr. Redfield's laboratory would fall into three divisions. "One devoted to the general study of sound, another to the applications of sound and a third to the investigation of hearing." Important place would be given here to a study of the theory and design of musical instruments. He also urges an analysis of "sound intensity" as a preliminary to proportioning the instruments of the new orchestra.

These and many other stimulating proposals are the best fruit of Mr. Redfield's deliberations. Coming to the esthetic prob-

lems of music, he reveals a more limited range. He finds that music utilizes eight factors, "Melody, harmony, rhythm, form, tempo, dynamics, tone color and nuance," and demands that the completed product shall appear "beautiful." Just what this term covers for him he tries valiantly to define in the second part of his book, in four chapters whose observations are evidently made from the vantage point of one on the outside looking in, and which will undoubtedly prove challenging to the more sophisticated and skeptical section of his public.

The future of music is the subject of part three in Mr. Redfield's book, and here he offers not solutions but problems that might properly occupy the workers in his suggested laboratory: harmonic possibilities, the rhythms of tomorrow, the improvement of old and development of new instruments, better voice training, the "symphony band" and so on. His consideration in this section of "differential tones," the musical matrix as it were, is one of the most fascinating in the book.

Discussing the defects of the violin, he says that they can be remedied, "but it is a problem for an engineer not for a musician. Put a violin in the hands of an able civil engineer—one capable of designing a suspension bridge—furnish him with a moderate amount of fundamental information about sound, tell him to improve the instrument, and in a year or so he will turn out such a violin as Stradivarius dreamed of all his life but never succeeded in building."

"In the very near future there is going to be a recognized profession of acoustical engineering." Let us pray that it will come while we are still on earth to enjoy the fruits thereof. We have heard of the remarkable investigations in this direction by W. C. Sabine of Harvard whose work was interrupted by his death. We sympathize with Mr. Redfield's plea that some of the benefactions for the making of additional vocalists, violinists and pianists, be deflected rather toward the erection of a laboratory. "If the musical philanthropist establishes an institution for the production of conductors and composers or for the improvement of musical instruments and music itself through research in the fundamentals of music, then he is entering a field where the harvest is great and the laborers are few."

Marion Bauer.