PRESIDENTIAL ADDRESS

WHAT INSTRUMENT DO YOU PLAY?

ELNORE STOLDT
Jacksonville High School, Jacksonville

It might be that there is such an animal as a typical scientist. Be that as it may, there seems to be evidence that, along with their other traits, scientists tend to an interest in music. Scratch any scientist and you are apt to permit the escape of quarter and half notes instead of red and white corpuscles. It might be argued that a similar tendency occurs in other professional groups, but among scientists it is particularly striking. It seems appropriate to allow curiosity to delve into reasons for the situation.

There appears to be no thoroughgoing analytical study to read about, but would it not be rather difficult to determine the exact extent to which a person is a good scientist, or to tell how deep goes his love of music? This study sorts out some facts and comments and proves not a thing.

The point is made here that scientists as a group have an *interest* in music and a liking for it. They are not necessarily talented, either as composers or as performers, although talent is often present to the extent that the scientist becomes known also as a musician. Pearl Buck, in her novel "Command the Morning", affirms that there is something of the artist in every scientist (Buck, 1959).

It has been interesting during the past four or five years to notice what scientists mention as hobbies, a listing of which will more often than not include a music activity. You know about Einstein and his violin. Borodin, who became one of the "mighty five", gave up a career in chemistry and medicine for music, and Schweitzer could have done so but chose otherwise. Occasionally, a musician and a scientist, each attracted by the qualities or abilities of the other, become closely-attached friends, a case in point being the friendship of Brahms and the Austrian surgeon Billroth, himself a brilliant musician.

In the first place, assuming that the particular association to which we direct attention is a sort of symbiosis and the scientist one of the symbionts, then what could the music as the other symbiont do for him?

Obviously, there can be no argument against the idea that whatever is pleasing can provide release at eventide of the tensions that have built up all day in a crowded laboratory, an over-silent workroom, or a mosquito - populated swamp. The "music hath charms to soothe" concept may, however, be dismissed as inapplicable, for the savage scientists form only a minority group. But music is *more* than a sedative.

Every scientist, whether aware of it or not, seeks to express what he learns, and music gives him a different way of saying something, so that he is not limited to the words of a language. Strangely, an idea turned loose to float on sounds, sounds arranged by the scientist or merely brought to his consciousness from a a composition by someone else, may later be caught and congealed into language printed on a page, and thereby left for all the world to use.

But there is also the possibility that music, in whatever form it appeals to him, could be a stronghold from which to fight the vast uncertainty of the times in which we find ourselves, uncertainty they say the scientists have brought upon all of us by providing tools and materials for human destruction.

In effect, it can be said that music offers to the scientist nothing more nor less than what it holds out to anyone else; nevertheless, the point remains: scientists are apt to seek something in music.

Now the scientist, the other symbiont, should have something to do for music.

In spite of a study made by Margaret Mead a few years ago, many persons still picture a scientist as a partly - bald, stooped, nearsighted man with a butterfly net in one hand and a magnifying lens in the other. This man is considered to have almost as much warmth as a computer, while a woman is not even imagined as a scientist. Certainly, such a caricature that has no factual basis should be erased. In casual conversation at the dinner of the Academy Conference in 1962, Dr. Paul M. Gross, then President of the A. A. A. S., kept repeating that we must encourage students toward graduate work in science and must destroy the popular image of scientists as unconventional, non-conforming people, and a large number of his fellowscientists subscribe to Dr. Gross' opinion. That leaves scientists with the responsibility of contributing to the arts as well as to the sciences. Assuming, then, that a scientist, male or female, is a standard-model human being with training in a special field and with a normal amount of sensitivity, what could he contribute to music?

Music needs to be supported by a willingness and ability to invent. Inventiveness, the scientist, by training or innate tendency, understands. Obviously, if no one had ever been interested in mechanics and designs, the only instrument available would be the human voice, untrained and without chance of improvement. Unless someone tried new combinations and sequences of tones, there would be few songs to sing.

There are those who argue that scientists have recently been carrying inventiveness too far. Digital computer numbers converted to sound waves, converted to tones,—but converted to *music?* Though it might

have programmed itself into the clumsy hands of the sorcerer's apprentice, the computer must be claimed by the inventing scientists. The work done rather recently by the Bell Telephone Laboratories and other research groups could open up unlimited instrumental possibilities, while also leading to clearer and more pleasant vocal communication. For one thing, a live musician never can duplicate exactly his performance of a composition. While this provides interesting and challenging variety, it leaves no exact record. It could be valuable to a student of music to know how a composer played his own work. A computer can provide exact repetitions, as well as predetermined variations, that would probably be more valuable for study and analytical purposes than for enjoyment. It has already been shown that it is possible for the computer to produce a very great variety of sound combinations. It can compose. What it composes is not very well liked by many persons, but many of us are not overly-attracted to jazz compositions, and some of us find Bach dull. Whether or not the creative musicians ever make extensive use of the computer as a tool, the scientists have given them the invention and ideas for its use. If the computer comes to be widely used for performance of music, one wonders what might become of some of the string quartets, choruses and other performing groups that scientists organize among themselves. Quite probably, a computer, concert grand or table model, will take its place as one more tool and will not exclude the others. What instrument will you play then?

Trained to patience and perseverance, the scientist could bring persistence to both composition and performance of music. The materials in the fields of both science and music are too extensive to comprehend without long, hard, intense work.

The scientist's sense of orderliness and design might be another contribution. After Pythagorus pointed out the relationship between the length of a string or a column of air that is vibrating and the pitch of the sound so produced, other Greek scientists worked with sound, allowing the science of acoustics to develop. From the investigations of Helmholtz there came the possibility of harmonies, so that a musical composition did not have to remain confined to an unaccompanied melody. While a large number of physicists continue to study sound, all present-day scientists who enjoy music are inclined to enjoy it to a greater extent because of their ability to comprehend its patterns or to devise new patterns if they are scientist-composers.

Those of us who teach in high schools are familiar with the remarks of students indicating that they simply cannot study unless radio or television is turned on; many of us would like very much to know if students would not learn more science in an environment providing less auditory stimulation, but the chances of our finding out about this are slight. In any case, the students never seem to know what music they have heard, so they really do not know the music, either. A trained scientist is apt, rather, to be attentive to music he hears, performs, or composes, even critical of it; accord-

ingly, because he has understanding of the music, his enjoyment becomes greater. Then he will buy records, attend performances, support civic symphonies and perform great compositions for his own pleasure, all of which tends to increase the public demand for the so-called "good" music — the kind persons want to hear in many repetitions.

There is no way of telling how much music we have lost, although possibly it is still all floating in the atmosphere and will sometime be recovered either exactly as it was or with time-worn edges. Fortunate it would be if at least some of the methods now available for preserving materials had been developed earlier in order to give us unfaded scores on paper that would never crumble and to make it possible to refer repeatedly to original manuscripts instead of to copies of copies. We know something of the forms of the early Greek music but nothing of its sound, for the invention of the phonograph came too late and in its early days was not able to reproduce a performance convincingly.

It is not difficult to indicate how music can be of value to a scientist, and how scientists can influence development and use of music, but to seek the reason for the actual symbiotic relationship (the interest of the scientist in music) it is pertinent to look at possible factors that might be present in both the scientist and the musician, especially the composer.

For one thing, indicating to scientist or musician that he cannot or should not do a thing is to challenge him to prove you wrong. Do you remember that Robert Schumann slipped a recognizable bit of the "Marseillaise" into the first movement of the "Carnival Jest from Vienna", and that at a time when the "Marseillaise" was not at all popular? Suppose we stated that it is impossible to grow persimmons on pine trees. Almost surely at the next annual meeting of the Illinois State Academy there would be a paper presented in the botany section, complete with slides illustrating persimmons on a pine tree.

Igor Stravinsky (Stravinsky and Craft, 1962) thinks that the muscian "should be wary of science, which is always neutral"; that is to say, neither positive nor negative in its approach. Scientists probably do not think of themselves as making neutral approaches to problems; "unbiased" is a better word for their attitude. They would agree with Stravinsky that music and mathematics are never purely logical, for if those disciplines were limited by logic there would be few new ideas presented.

At one time Bertrand Russell expressed the opinion that science and music each searches for the truth. Although to understand this we have the problem of defining truth, an evasive term, it does seem that each scientist or musician is attempting to reveal that which is true to him. Do you think both would subscribe to Robert Frost's definition—"Nothing is true except as a man or men adhere to it, to live for it, to spend themselves for it, to die for it" (Untermeyer, 1963)?

In an article appearing in *Saturday Review* in February of this year James Baldwin says "the primary distinction of the artist is that h

must actively cultivate—the state of being alone"; then, later, "The artist is distinguished from all other responsible actors in society — the politicians, legislators, educators and scientists by the fact that he is his own test tube, his own laboratory" (Baldwin, 1964). Is the scientist really so different in this respect? Surrounded by all the physical equipment of the laboratory, are not his achievements still produced within the test tube of his own mind?

Virtually all the ideas here presented have been discussed at different times and by persons of varying backgrounds, compounding examples of scientists interested in music and emphasizing the imaginative qualities of scientific and musical persons, but there seems still to be nothing very specific by way of explanation. There are several enlightening articles in an issue of *The London Times Literary Supplement*. The one written by P. B. Medawar (1963) is thorough about analyzing the imaginative way in which a scientist works. The featured article by C. P. Snow bears the title "The Two Cultures: a Second Look" and is, of course, a reappraisal of his original discussion-provoking lecture emphasizing science as one culture and literature, not music, as the other, so that what he says does not apply to the present discussion except to the extent that literature and music have some similarities. He says that in the United States, as compared with European countries, the division between the two cultures "is nothing like so unbridgeable" and that in several of our larger universities "students of the sciences are receiving a more humane education" (Snow, 1963). If this is the general situation, then perhaps the connection between scientific ability and music interest is more noticeable in the United States than it would be in some other parts of the world.

We have, in these remarks, indicated a few fragments of themes that make up the whole symphony in which the scientist, the musician, the science, and the music are exposed, developed, harmonized, merged finally into one resounding chord. Each scientist is assigned a chair for a performance that lasts as long as his life, and he may choose his own instrument. He is obliged only to play his very best and to leave each phrase a little better than he found it. "Real happiness", said Schnabel, "will only be established in human beings when much will be expected from their inner qualities and higher potentialities" (Schnabel, 1963). In the grand performance that molds together all the productiveness, all the happiness of human lives, what instrument do *you* play?

Acknowledgments

For assistance in preparation of this manuscript grateful acknowledgment is given to Mr. Hugh Beggs, Professor of Music at MacMurray College, and to Dr. Frank B. Norbury, specialist in internal medicine, both of Jacksonville. Miss Joan Hunter, of the biology department of West Aurora High School, contributed some of the ideas discussed.

Literature Cited

Baldwin, James. 1964. The creative dilemma. Saturday Review, 47 (6): 14-17, 58.

BUCK, PEARL S. 1959. Command the Morning. New York, The John Day Co. 209 pp.

MEDAWAR, P. B. 1963. Imagination and hypothesis. The London Times Literary Supplement—(3,217): 849-850.

SCHNABEL, ARTUR. 1963. My Life and Music. New York, St. Martin's Press. 223 pp.

SNOW, C. P. 1963. The two cultures: a second look. The London Times Literary Supplement—(3,217): 840-845.

STRAVINSKY, IGOR, and CRAFT, ROBERT. 1962. Expositions and Developments. Garden City, Doubleday and Co., Inc. 179 pp.

UNTERMEYER, LOUIS. 1963. Letters of Robert Frost to Louis Untermeyer. New York, Holt, Rinehart and Winston, Inc. 388 pp.

Manuscript received April 24, 1964.