What Makes Stereo Stereo?

Theodore Daigler

*Philippine Studies* vol. 8, no. 3 (1960): 639—643

Copyright © Ateneo de Manila University

Philippine Studies is published by the Ateneo de Manila University. Contents may not be copied or sent via email or other means to multiple sites and posted to a listserv without the copyright holder’s written permission. Users may download and print articles for individual, noncommercial use only. However, unless prior permission has been obtained, you may not download an entire issue of a journal, or download multiple copies of articles.

Please contact the publisher for any further use of this work at philstudies@admu.edu.ph.

http://www.philippinestudies.net
Fri June 30 13:30:20 2008
Communism is dehumanizing, because it is godless and soul-less. Materialism is a vital part of Marxism, and materialism, of course, denies God and the human soul. When God is denied, there is no one over the State to limit its power or to curb its excesses. If a man has no soul, he does not really differ from brute beasts. He can be tamed and trained, by some means or other, to jump through hoops, without thinking, at the crack of a whip.

Most of the many political prisoners whom I knew in China were men, quiet, but courageous and decent. There was a line which they would not cross, a depth to which they would not stoop, because they wanted to remain men. They would not abandon the hope, nor deny the right, of the mind of man to search for truth, and to state it honestly. They would not give up or deny the right of the will and heart of man to search for what is decent and good, and to defend it bravely. If we bought Communism, we would pay for it with a most precious birthright, our human dignity.

CHARLES J. McCARTHY

What Makes Stereo Stereo?

The question is often asked: What is the difference between high-fidelity and stereo? The answer is that high-fidelity may be found in monophonic as well as in stereophonic sound and it simply means that the sound is a realistic reproduction of the original, or at least that the reproduction closely simulates the music heard in actual performance. Now this in detail implies that monophonic as well as stereophonic reproduction be free from noise. Or as the hi-fi jargon puts it: “There must be high signal-to-noise ratio.” Then there must be conspicuous clarity undistorted by the hi-fi mechanism. Thirdly, the sounds of the highest and of the lowest pitch, together with their harmonics or overtones, must be heard. That implies that there should be a frequency response ranging from 30 to 15000 cycles and that this response be uniform or smooth throughout the whole range. Fourthly, high-fidelity requires that the range between the loudest and the softest sounds of a live performance be substantially retained. That means that the mechanism should be capable of producing these sounds without strain or distortion. It does not necessarily have to equal the intensity of the original, but there should be a reasonable approach to the original level.

Now to come to the characteristics of stereophonic sound that make it not different from monophonic sound but superior to it,
especially when the reproduced sound is that of an orchestra or chorus
or even a smaller ensemble. First, in stereophonic sound there is the
sense of direction in the sound as coming from the left or the center
or the right; and also, especially so I would say, the sense of space
as to depth, that is, in front, half way back, all the way back.

How can we explain the directionality of stereo sound? There
are at least four explanations. Remember that when one listens to
stereophonic sound he listens to sounds coming from two loudspeakers
separated by a considerable distance and that the sounds proceeding
from the two speakers are somewhat different, since they were picked
up originally by three microphones (on the discs the three sources
are fused into two), each separated from the others at some distance.
It happens then that there is a slight difference in the arrival time
of the sound at each ear. It is enough for instance that the sound
reach the listener’s left ear a half millisecond before it reaches his
right ear for his mind to conclude: “The sound is from the left.”

Next, there is an intensity difference at each ear. A sound that
strikes one ear at a certain intensity would strike the other ear at
a different level of loudness. This difference helps the mind to deter-
mine the direction of the source of the sound. There is also an increase
in the air pressure on the ear nearer to the source and a decrease
on the ear away from the source. The higher the frequency of the
sound the more notable is this difference in pressure, since the wave
length of high notes is very short in comparison with the distance
between one ear and the other. This is why the listener can more
easily identify the direction of sounds with high frequencies than those
of low frequency.

Thirdly, it is said that the differences of the wave form at each
ear help account for the sense of directionality. The meaning of this
is that while the ear nearer to the sound source and in the more direct
path of the sound would pick up the fundamental sounds rich with
their harmonics or overtones, the other ear, being shadowed by the
head and not turned in the direction of the sound source, would not
pick up all of the harmonics.

So far the reasons given point mainly to the lateral sense of
direction. It remains to give a reason for the illusion of instru-
ments arrayed in depth. We normally receive sound both
directly from the source, that is, the instruments, and indirectly
as the result of reflections from the walls or other surfaces and from
the objects in the concert hall or studio where the sounds originated.
Now the ratio of direct to reverberated sound helps us to locate the
source. By experiment it is established that when the ratio of direct
sound to reverberated sound is higher the listener locates the sound
as nearer, when the ratio is lower the listener locates the sources as
farther back.
In reproducing sound, then, the illusion of instruments arrayed in depth may be attained partly by eliminated reverberation from one or the other speaker. It may be that the mind spontaneously concludes to spacing the sounds at varying depths as the ear picks up the different amounts of reverberation associated with each instrument. Also the mind may give precedence to the direct sound over reverberant sound on the basis of arrival time and in so doing locate the sound in depth.

In view of what was said about reverberation, it should be pointed out that care must be taken lest reverberations be stirred up by reflecting sources or objects in the room in which stereo sound is reproduced, since they may interfere with and distort the sound that comes out of the loudspeakers.

Another feature of stereophonic effect is the sense of spaciousness. This is the illusion that the performance which the listener is replaying in his living room is really taking place in a large hall. The sound seems to pervade the room and saturate it. There is an auditory sensation of fullness beyond the apparent capacity of the two speakers from which the sound really comes.

This sensation of spaciousness, is achieved by the placing of the two stereo speaker cabinets at some distance from each other and by the reverberation that was actually picked up by the microphones and recorded on the tape in the hall where the music originated. Of course, care must be taken by the recording engineers lest the time intervals between direct sound and reverberation become excessive and produce disagreeable echo rather than the pleasing concert hall effect.

Opera was written for the stage and depends in great part for its success on lighting effects and costuming. Stripped of these and recorded in a monogroove, opera was reduced to ghost opera. Only a conscious effort to put the singers on an imaginary stage while listening made it tolerable. Now with the stereo illusion of direction recorded opera has made a notable advance. Light and color cannot be reproduced in a recording but the movements of the various singers can. The place of the chorus on the stage can be portrayed to the listener. Here is something then that can be more fully exploited in the art of recording opera. Since opera cannot be recorded with all the advantages it enjoys on the stage, why not use at least the advantage stereo does have in its auditory field and apply that to the recording of opera? The aural effect of the movements of the principal singers do involve the listener in the drama. Similarly the sense of direction of the off-stage choruses is more pronounced than on the real stage and there is a startling difference between the sound of a chorus singing, for
example, first in the open air and then inside a temple. These and
other aural effects have already resulted in producing a new kind of
recorded opera different from stage opera. In addition the stereo
sounds of the opera orchestra can be brought to the ears of the
stereo listener as they would not be heard in any theatre on earth.

London Records has been the leader in this new approach to re-
cording operas. Other companies have followed. The dramatic effects
will strike you if you listen to London's Rheingold, Mefistofele, Fan-
ciulla, Bohème, Aida.

Character portrayal which involves different emotional states and
mental attitudes is not very difficult when the singer can make use
of gesture, costume and all the various visual props of the stage;
but in a recording, character portrayal depends entirely on the color
of the singer's voice. Outstanding is the character portrayal of
Dietrich Fischer-Dieskau in Deutche Grammophon's recording of
Mozart's opera Don Giovanni.

Among the very good stereo magnetic cartridges now on the mar-
et are Fairchild SM-1; SHURE M3D and M7D and GE VR225 and
VR227. At the very top in price and perfection is SHURE, arm and
cartridge combined—M212; and its equal in perfection but more moder-
ately priced, PICKERING 380A and 380C.

It may happen that the distortion you hear comes not from
your amplifier or speakers but entirely from your failure to set the
stylus pressure on the record as recommended by the maker of your
cartridge, e.g. 25 grams for 380A; 3-4 grams for SM-1, 5 grams
for M7D.

Here are some recent recommended stereo recordings:

Epic BC-1016. Handel's Water Music. This will appeal to nearly
everybody; a fine recording.


Angel S-35511. The same piece played by Gilels. Both excel-
lent, and the stereo sound in both superb.

London CS-6094. Beethoven's Piano Concerto No. 3, Backhaus
playing. The first satisfactory recording on disc of this piece.

Mercury SR-90134. Fiesta in Hi-Fi. Modern compositions bril-
liantly played by Henson and the Eastmen Rochester Orchestra. For
young folk of any age.

Mercury SR-90209. Tchaikowsky's Serenade for Strings and
Arensky's Variations on a Theme of Tchaikowsky. Brilliant.
NOTES AND COMMENT

VICTOR LDS-6409. Beecham's version of Handel's Messiah. No matter what the purists say, I find this entrancing. The orchestra and chorus are brilliant and the soloists good. The tempo may seem a little slow at first but then the strong accent grips you and it seems just right.

COLUMBIA MS-6063. Mozart's Violin Concertos 3 and 4 played by Francescatti. Entirely graceful and lovely.

THEODORE DAIGLER