The Role of Semantics

• As my wife and I are of English origin, we are well aware of differences between our former and present usage of that language: English and American. A friend once said, "The English and the American are two peoples separated by a common language." Perhaps the best illustration of this aspect occurs in the usage of the word "homely."

In England, to call a woman "homely" is a pretty high compliment. Perhaps the best American equivalent to the English usage would be "affable." It means easy to like, get along with. It describes someone who quickly makes you feel at home, comfortable, which is surely a desirable trait. Over there, it has nothing whatever to do with looks.

Getting nearer to our kind of business, there are spanners and wrenches, boot and trunk, bonnet and hood, valves and tubes, and a whole lot more translations where the English and the American use different words for the same object.

But that is not what this column will be about. However, it may relate to it in a way: people sometimes read what I write and assume that, because I am (or was) English, I express myself differently, and therefore I do not mean what I appear to say, although actually I am using English in the American way. So in that sense, the above obstacle may remain, to an extent.

In most instances, exactly the same misunderstanding could occur on either side of the Atlantic. It is a basic misunderstanding, not a difference in

meaning. Let me illustrate with a few examples, to make my point.

RESISTANCE OR IMPEDANCE?

We have frequently gone over the use of technical terms like input impedance and output impedance. For many perhaps, the term impedance is difficult to distinguish from resistance, since both terms determine a relationship between voltage and current. But at the input or output of an amplifier, for example, what is it that determines this relationship?

Put simply, it is the relationship between voltage and current. You can measure voltage between the terminals. and you can measure current between one side and the other. Now, what determines this relationship? At the input, it is the impedance inside the amplifier. At the output, it is the load impedance to which the amplifier is connected.

If you disconnect, in either case, the voltage will still be there, possibly increased by removal of the load, on the input side of the connection. But it will have vanished from the other side. because you have disconnected the two: now no current flows.

However, as generally used in specifications, "output impedance" signifies the impedance to which the amplifier *should be connected,* rather than any impedance inside the amplifier itself.

The complication in understanding comes because, whenever you make such a connection, you are connecting two impedances together. At the input, you connect the impedance of a microphone, for example. to the internal input impedance of the amplifier. At the output, you connect the output of the amplifier to the impedance of the loudspeaker—or whatever.

Maximum power transfer theory says that these two impedances, in each case, should match, or be the same. We have discussed in other columns why that is not always the best arrangement. In fact, the microphone's internal impedance is usually somewhat lower than the amplifier's input impedance. But if it is specified as a "50-ohm mike," that usually means it should be connected to an amplifier whose input impedance is rated as 50 ohms. The mike's own actual impedance may be, say 25 ohms.

At the output end, the difference is usually even more marked. If the impedance is given as 8 ohms, that should be the nominal impedance of the loudspeaker. It is also the designation used for the amplifier output, for that reason. But the amplifier's own internal output impedance will usually be only a fraction of an ohm.

A few paragraphs back, I started with the words, "Put simply." Modern educators would write that, "Put simplistically." Why all those extra syllables? That is another instance of special usage, or in this case, a "sophisticated" development of words. Either way, it implies there may be more to it than first meets the eye.

These complexities are understood, to those who understand the technology involved. In our case, this means they have studied, or are educated in audio technology. A person who can explain all this to you, will sometimes be called "erudite," especially if the person making that description happens to be an "educator."

Erudition, the noun form of erudite, means "book learning." Someone who is well-read is properly termed erudite. Unfortunately, the word often implies more than that: from the way it is said, you would think that the person so described knows a lot. Perhaps in fact, he knows very little, but can

quote a lot of what he has previously read.

This further relates to the distinction between education and instruction. Today's "educators," which unfortunately has come to mean those employed in the business of schooling. commonly misnamed education, equate the two terms: to them, instruction *is* education. The concept seems to be, "I have told you; therefore, if you remember what I told you, you know."

But what if I tell you black is white? Do you now know that black is white? You may very well remember that I said black is white, because you probably thought, "That guy must be nuts! Anybody knows black is not white." If you thought my statement was instruction, your reaction was that it cannot be true. But it got you thinking, didn't it? Which means it was a step in your education.

In this instance, I just said something obviously wrong, to make a point. But in more constructive circumstances, it might only appear to be wrong, until your thinking about it brought the understanding, based on all the pertinent facts, that it is true.

To summarize the distinction between instruction and education: instruction is accepting, and repeating where appropriate, what the teacher or the textbook says, as true; education, on the other hand, is applying yourself to understand what it is all about, so you know, and can reconstruct or apply what you know.

NO. 2 PENCIL STRIKES AGAIN

This brings me to the way my column in the November issue was edited. It failed to say what I wrote it to say, because the editor, innocently enough I am sure, failed to understand my intent.

Early in that column, my manuscript referred to some documentation I put together while at Tannoy, on what later became known as systems design methods. It was used, I went on to describe, to enable newly engaged engineers to apply the method to any new system they might be assigned to design.

The editor apparently thought this documentation was a "manual," so substituted that word. A *manual* is a handbook that tells you what to do, in one, two, three fashion. *Documentation* is a setting of information on paper, or putting it on record. The information can be anything that thus needs recording, and it could well be in the form of a handbook, or manual.

But in this case it was not. The editor could scarcely be expected to know the nature of that documentation, because he had not seen it, and I did not describe it in any detail. It was hardly appropriate to try to do that in the limited space of a monthly column.

Later in the column, I referred to my now-out-of-print book, "Taking the Mysticism from Mathematics." That is not a manual, or handbook. Nor is it a textbook. But having concluded my "documentation" was a "manual," my reference to this book seemed irrelevant, so he blue-penciled it out.

The very point of that column was that a caller, asking to buy half a dozen copies if I had them, drew attention to something I myself had not realized: that the same method that proved successful in systems design, contained in the documentation I prepared at Tannoy, I applied in the book to education in general, and to mathematics in particular.

He would not have known this, had not the documentation referred to, which I had completely forgotten by that time, been preserved in secret government files to which he and the other people who wanted copies of the

book, had access. My purpose in last November's column was to draw attention to the importance and universality of this concept of systems design.

As the documentation was there recorded, it could not be put into a manual. Last November's column, as published, did call attention to some manual-type things that do not work (at least as well), which in those days (back in the '30s) we described as "the brute force method." Nowadays that would be described as "doing it by the book"—or the manual.

By editing out the reference to the book that applied the same basic method in a completely different context, November's column omitted the positive side of what I intended it to say. Perhaps the same distinction can be shown by reference to two more words, one of which appeared in that column as printed: application and utilization.

Application means taking something and applying it, in perhaps one, two, three fashion, as you might from a manual. Utilization means putting something to use. Utilization would more appropriately fit with the form of documentation I was talking about. But the word the column printed was application.

The book, "Taking the Mysticism from Mathematics" showed quite clearly how hang-ups in math occur—and by application, that could include other subjects—and from that, how to remove your own hang-ups and become proficient at learning that subject. I have a file full of testimony that it works.

PROBLEM-SOLVING

Fairly obviously, such a book is not a manual: you could call it a problem-solving procedure. First you find out why you have a hang-up. But then you have not necessarily solved that hang-up, unless you also remove the cause. And part of the cause is often just the thing we have been discussing here: that you want simple, a-b-c-type answers, without bothering to "put your brain in gear."

The same comment goes for true engineering, in any context. It is from such constructive efforts, based on true ingenuity—which can never be put into a manual—that progress results. As an earlier column of mine once said, Edison did not invent the light bulb by going down to the corner newsstand and buying a paperback on "How to invent the light bulb." ■