by Glenn Hauser

As a theme it took Gordon Nelson six pages to develop, and with a formidable name like "subaudible Heterodynes" you may think it's a complicated technique beyond your ken, requiring lots of arcane equipment.

False. SAHs can be observed on just about any receiver, though it certainly helps to have an S-meter. The only skill necessary is the ability to count rapidly. And the only accessory necessary is an accurate clock or watch with a sweep second hand.

We know that two signals of slightly different frequency produce a "beat" when mixed--and the pitch of the beat is the same as the difference between the two frequencies. Subaudible doesn't mean you can't hear an SAH at all--it just means the pitch is below the 30 Hz or so the average person can detect.

We can, however, hear the effect produced by the SAH if not the pitch itself. This can best be described as a "flutter" of extreme regularity. The flutter is most obvious when two signals are of equal strength. They show up best when a stronger signal is almost, but not totally nulled.

On the crowded domestic regional and local channels, SAHs are usually lost in the confusion. SAHs in profusion account for the extreme jumpiness of the S-meter on graveyard channels. The stations are not actually fading in and out with such rapidity.

Two stations at a time is plenty on a frequency...they produce one SAH. Three stations produce 3 SAHs, four make 6 SAHs, five make 10 SAHs, and so on. SAHs are easy to observe on the "clears"--for instance I just determined that WKYC and KREX at one particular moment were 2.3 Hz apart.

How did I do it? I positioned the antenna so the signals were roughly equal. This made the S-meter take deep dips in a regular fashion about twice a second. Then I simply counted the number of times it dipped, keeping one eye on the needle and the other on the sweep second hand, during a minute's time. Naturally, the longer you listen, the more accurate the determination will be. Stations can vary significantly in frequency during as short a period as one minute. In the first fifteen seconds, I counted only 31 dips; in the first thirty seconds, 65 dips; and in the full 60 seconds, 138. The stations were drifting slightly further apart as I watched!

To convert to cps or Hz separation, divide the number of dips by the number of seconds in which they were counted. 138 cycles per minute = 2.3 cps, or 2.3 Hz.

For me, counting needle dips works up to about 10 Hz. After that it becomes difficult to count along in step. At this point, a slightly different technique may help. Instead of trying to count up to 600 in a single minute, try counting to ten or so over and over, without pause, as you watch the sweep hand. "onetwothreefourfivesixseveneightninetenonetwothreefourfivesixseveneightnineten," etc. By trial and error, you can determine the SAH. If counting up to 10 makes you fall behind each second, then try eleven. If counting to 10 puts you ahead, then try nine, and so on.

See how simple it is? Of course, you can do a lot better with a scope, panoramic display, or chart recorder. You can then determine which station is high and which low.

The European Broadcasting Union publishes a periodic summary of precise frequency measurements of stations heard in Europe, and NRC's DXN reprints it. As far as I know, no one does this for North American or Pacific stations.

The SAH technique is most useful when DXing Europe, of course. An SAH on a TA channel gives you early warning that not just one station, but two are trying to come in. While you may not be able to pull any audio, and certainly won't be able to send a useful reception report, observing SAHs can give you a good idea of the extent of the opening, when keyed to a recent edition of the EBU list.

When there are only a few stations on a TA channel, and you get an SAH very well matching the listed separation, you may be tempted to count these countries in your "heard" totals--after all, the circumstantial evidence is very good that you did receive signals from those countries. But most DXers would stop short of doing this, preferring to have at least some audio as corroboration.

If you detect an SAH on a Latin American split, consider yourself fortunate. Freq. control south of the border leaves something to be desired. Even though two stations may be known on, say, 965 kHz, chances are in reality they'll be far enough apart to produce an audible heterodyne--often in the annoying range of 30-100 Hz, as perfected by the Cubans.