science news

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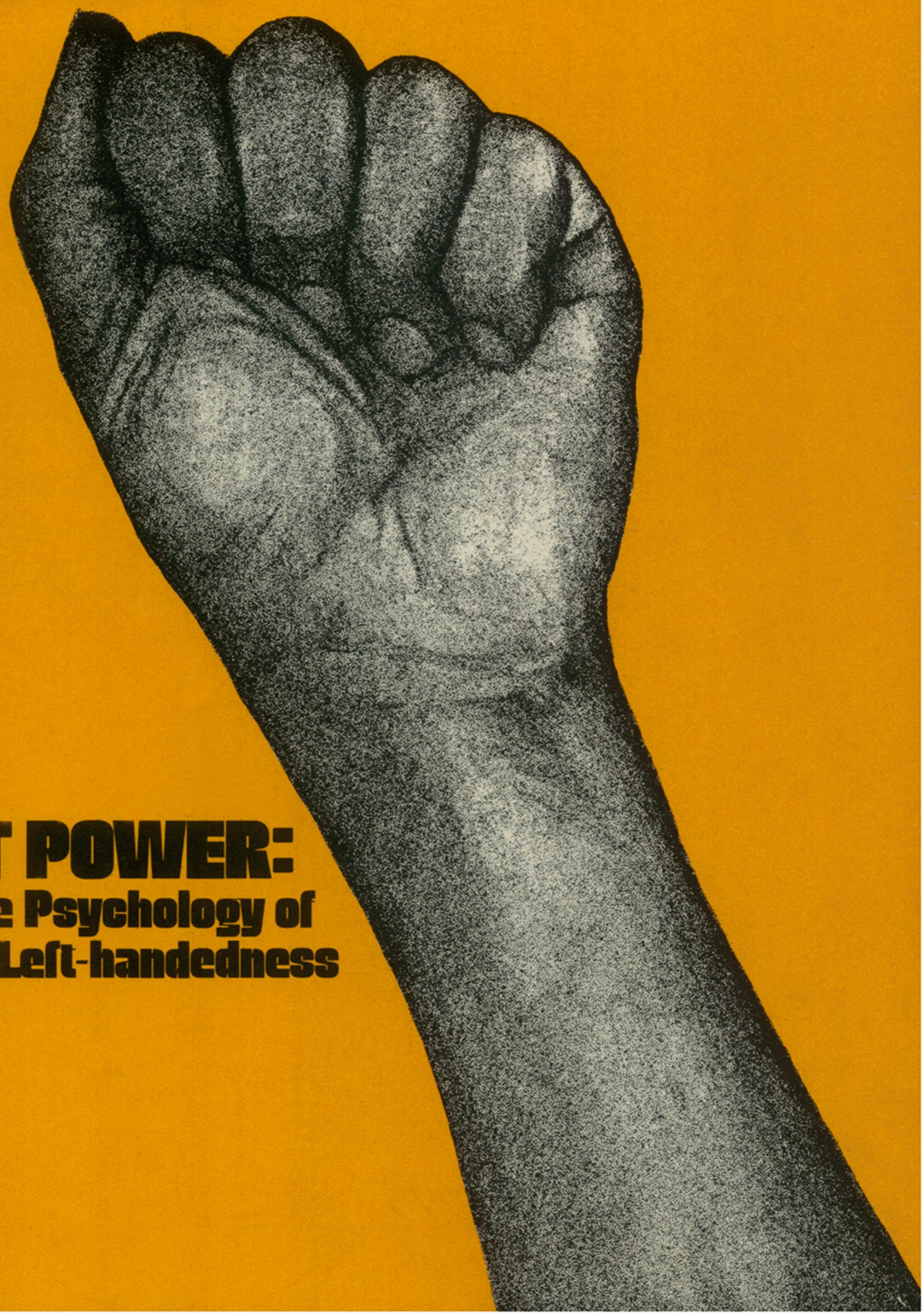


LEFT POWER:
The Psychology of Left-handedness

Conversation Pieces

Technically intriguing items from TRW, guaranteed to add luster to your conversation and amaze your friends.

The Great Communications Traffic Jam

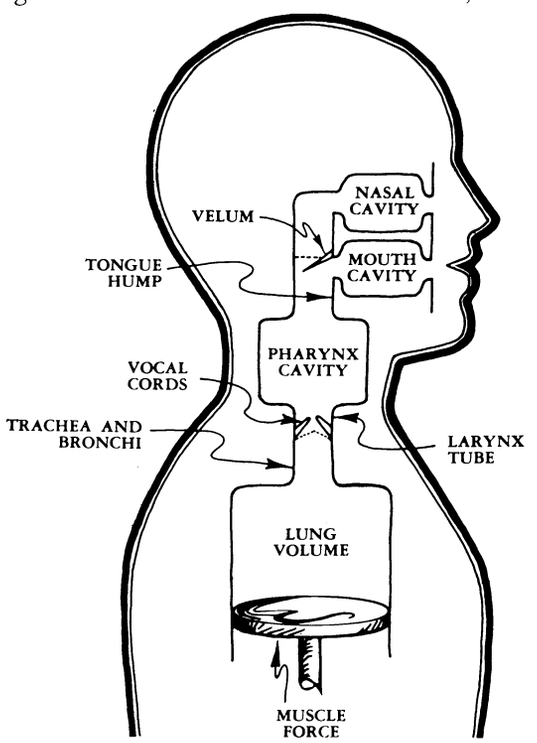
If you've ever listened to a citizen's band radio, you know about crowded airwaves. With two or three people trying to talk on each channel, there's often more frustration than communication.

The situation is more controlled for transcontinental and international traffic but the jams are building up there, too, particularly at the Christmas and Mother's Day peaks in the United States.

One solution is to use higher frequencies, even laser communications, and take advantage of the extra bandwidth. But the technology is expensive and, so far, it's developing gradually rather than explosively.

A possible interim solution is voice compression. It won't do a thing for CB fans yet, but it looks very promising for the telephone companies and government communication networks. Here's how it works.

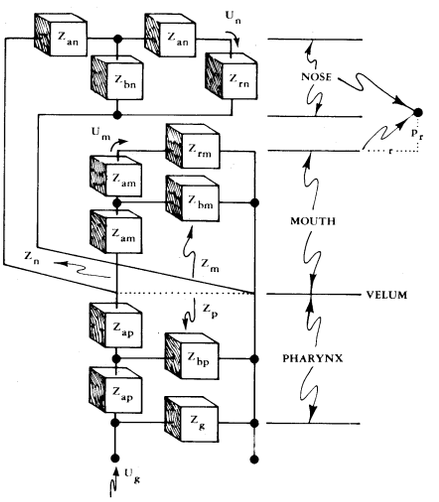
You first put the voice signals from a microphone through an electronic box that digitizes them. This simply means that each up or down step in the range of the speaking voice is turned into a set of ones and zeros, or data bits.



The human speech generation system consists of a bellows (the lungs) that pumps air past the vocal cords and through a series of resonating cavities (the pharynx, mouth, and nose). Nerve impulses regulate frequency and volume.

If you use a high data rate (i.e. divide the voice range into many, *small* up-and-down steps and sample them frequently) you get enough digital data at the receiving end to reconvert the digital signals into natural voice. If you compress the voice by using fewer, and therefore bigger, up-and-down steps (or by sampling the steps less frequently), you may get the *words* out at the other end but the speech has a flat quality.

The crucial problem, then, is how to conserve bandwidth by compressing the voice but still maintain good quality. The people in TRW's Voice Processing Lab have been remarkably successful in doing just that. With an unusual combination of linguistic and mathematical modeling skills, they're beginning to develop systems that will do the whole job automatically. With large-scale integrated circuit technology, plus volume production, costs may eventually be quite low, too.



Careful evaluation of the properties of human speech forms the basis for refinement of the basic algorithms (mathematical descriptions of the human speech system and its mechanical and electronic analogs) that enable programmers to compress the digital speech signals. TRW's multidisciplinary team is working with specialists in electronics to develop techniques that use relatively few data bits per unit of speech, yet preserve the natural quality of the voice.

For further information, write on your company letterhead to:

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