

control and communication theory, whether in the machine or in the animal, by the name *Cybernetics*, which we form from the Greek κυβερνητης or *steersman*. In choosing this term, we wish to recognize that the first significant paper on feed-back mechanisms is an article on governors, which was published by Clerk Maxwell in 1868 [*Proc. Roy. Soc. (London)* March 5, 1868], and that *governor* is derived from a Latin corruption of κυβερνητης. We also wish to refer to the fact that the steering engines of a ship are indeed one of the earliest and best developed forms of feed-back mechanisms.

Many writers, Greek as well as French, French as well as Italian, must have used the word, since it appears to be a common word meaning the "steersman's art," and that phrase, while quaint today, must have been as commonly used as *navigation* or *driver training*. Calling *Duco Duco* or *Kodak Kodak* called for more imagination and commercial savvy and were genuinely coined, not merely borrowed. But what difference does it make? Words after all are, as Henry Ward Beecher said, "pegs to hang ideas on." And Wiener and his circle certainly succeeded in doing that.

KENNETH J. WARD
910 North Sheridan Road,
Lake Forest, Illinois

Looking Ahead

In arguing for greater support of gerontology, Robert R. Kohn (Letters, 5 Nov., p. 685) says, "Aging processes are . . . of more personal concern to us than, for example, mantle-drilling or the space program. . . ." And rightly so.

According to a story popular in Germany (East and West) during the 1950's, Gottwald was checking the budget one day, and the dialog with his advisers went about as follows:

"What's this? An addition of 100,000 marks for the grade schools? No. Denied. An addition of 500,000 marks for the advanced schools? No, denied."

His advisers handed him the next batch, and he continued:

"An increase of 300,000 marks for playgrounds and parks? No. Denied.

"Another 50,000 marks for libraries? No. No. No.

"Add 150,000 marks for children's hospitals and lying-in homes? Denied."

So it went. He cut every departmental budget until he came to the one for prisons.

"What's this? No increase for pris-

ons? The same budget as for last year? No. Double it! Allocate at least a million marks for prison hospitals, libraries, and recreation centers. And double the operating budget."

One of his advisers remonstrated, "But sir, you have cut all the other institutions, particularly the schools. Now why do you increase the budgets for the prisons?"

Gottwald stared at him meaningfully for a minute, then explained, "We've been to school."

As the man says, we can all expect to be aged. Shall we stint the plans for improving that condition?

F. C. DYER

4509 Cumberland Avenue,
Chevy Chase, Maryland

Messages from an Elder Scientist

. . . In his article on the development of the chemistry of solutions ("Order from chaos," 22 Oct., p. 441) . . . Joel Hildebrand delineates the difference between a true scientist and a mere practitioner. The one has schooled himself to understand; the other has devoted his academic life to learning all the recipes. Here is a message so vital to a beginning scientist that he hardly dare disregard it. . . .

The article carries also, by example rather than precept, a message about effective communication among scientists. It is replete with examples of communication at its best. Consider this statement from his discussion of scientific prediction: "The odds are extremely high for predicting an eclipse, . . . near zero for the time when John Doe will die." He might have written it this way: "Prediction of an eclipse can be accomplished with an extremely high degree of accuracy, but it should be noted that the probability factor changes considerably in the case of predicting the time at which life ceases for a human being." Naturally, the need for good communication becomes much more imperative when an elder scientist is trying to teach a younger one. The stuffed-shirt approach to science writing never inspired anyone. Yet how many elder scientists continue to expound their ideas in a writing style like that of a master's thesis. . . .

WARD W. KONKLE

Agricultural Science Review,
U.S. Department of Agriculture,
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