and incorrect. The statement is irrelevant because Gilbert's conclusion "portrayed that aspect of modern information theory which relates to explicit coding systems intended to signal at high rates." It did not deal with the general applications of the theory. Although that very difficult problem has not been solved in a broad and general sense, nevertheless Bross's statement is incorrect because Gilbert's paper cites many significant steps toward the solution of the problem.

These steps include many excellent special solutions which have not found wide technological use because of economic limitations. These are tangible achievements. The economic limitation in technology is being reduced rapidly by the decreasing cost of devices for coding and decoding. Would Bross suggest that we abandon thermodynamics because most heat engines do not reach ideal efficiency?

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Excluding information theory, I have always had the impression that simulation and fields mentioned by Bross under the name of "mathematically oriented new sciences," are not "sciences" at all, in the full meaning of this word. These may be new tools in technological sciences, perhaps mathematical physics and the sociological sciences, constructed primarily for engineers, applied mathematicians, and theoretical sociologists (if the name is proper) to enable them to cope with more complicated problems.

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Experimentation on Humans

Your debate on the ethics of human experimentation (Letters, 13 May) reminded me of my undergraduate experience in 1927 when I served as a human guinea pig for a Nobel laureate, Professor A. V. Hill. Hill was always eager to explain his theories concerning oxygen consumption by the human being while working under stress. At the time he was testing the candidates for crew, he even apologized for not using his oxygen measuring device on himself under the stress of rowing. He found it impracticable, he said, since he had great difficulty handling both the stick and the sliding seat of a rowing machine.

Because I broke his record for the consumption of oxygen per unit of time while under stress of severe exercise, Hill paid me a great deal of attention. Later, when a track man surpassed my record, Hill was very eager for me to run with his device in an attempt to regain the "world's record for oxygen consumption," as he called it. Since running is a faster motion than rowing, he hoped that I would show greater oxygen intake. My coach was reluctant to give his permission as the rowing season was upon us and he feared running would make me lame. Although "jolly well disappointed," Hill would not consider testing me while the exercise stress was running. Throughout, Hill considered the convenience and welfare of his guinea pigs; the convenience of the experimenter came second.

Owing to my experience with Hill, I am strongly in favor of human experimentation, especially when the subject is also the experimenter. As a research scientist in biology, I have not hesitated to experiment on myself. Two years ago, when I developed symptoms of coronary disease I tested an essential trace element combined with a vitamin that had "no established minimum daily dosage." The results exceeded my fondest hopes, and numerous symptoms, including one that had been conspicuous for 40 years, disappeared.

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A Protest of Innocence

In his article, "Speaking of space" (13 May, p. 875), David McNeill gives credit (or blame) where it is not due when he imputes certain contributions to "space speak" to newsmen.

". . . some of the most popular specimens . . . [were] invented by newsmen . . . among these are *A-OK*, *blast off*, and *spin off*," McNeill says.

To my personal knowledge, "A-OK" was invented not by newsmen but by an imaginative public relations man named John A. Powers, who as "Voice of Mercury" of the flight of Alan B. Shepard in May 1961 attributed the phrase to the astronaut. Later it developed that Shepard had not said "A-OK," but by that time the phrase was a part of the English language, having been *adopted*, not *invented*, by newsmen.