Letters

Uranium Enrichment

It is stated in William D. Metz's Research News article on laser enrichment of uranium (16 Aug., p. 602) that scientists working in this area at Los Alamos are rumored to be ahead of scientists at Lawrence Livermore Laboratory but are keeping their progress secret. The rumor that we are responsible for the classification of this project is emphatically false.

The classification was initiated in 1972, early in the history of the project, by the members of the Atomic Energy Commission in Washington and has recently been upheld. We who work in this area at Los Alamos are thus not allowed to make public disclosures of our work.

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Clean Air by 1975?

The revisions of the Energy Supply and Environmental Coordination Act of 1974, as described by Constance Holden (News and Comment, 21 June, p. 1269) sound extremely rational in the face of the apparent inevitable setback of clean air goals that has resulted from insufficient foresight, insufficient determination by both government and industry, and the cussedness of things in general. However, the end result will be catastrophic.

As nearly as I can tell, industry compliance dates have been advanced into the future, while nothing has been done with the target dates for achieving the national primary air quality standards. These still remain in the 1975–1977 biennium. Accordingly, local agencies, such as that of the state of Colorado, are forced to achieve ambient air quality goals during a time when air pollution is being allowed to continue unabated or to increase.

The impossibility of achieving clean air goals is not envisioned under the due process of the law. As a result, local authority is progressively usurped by federal authority, which cannot solve the problem either, but is apparently legally entitled to fail. In addition, major emergency regulations are being forced upon the citizens that will be dropped in only 1 or 2 years, as source intensity finally begins to drop. The result will be a progressive loss of credibility by the local agencies, by the Environmental Protection Agency, and finally by the entire environmental movement.

Had the Clean Air Act of 1970 been taken seriously from its inception, the present crunch would not have occurred. Since industry in general appears not to have taken it seriously until about a year ago, compliance with the 1975–1977 dates has become impossible, and the situation is certainly exacerbated by the national energy problem. If Congress in its wisdom opts to extend further the compliance time of industry, then it must extend as well the compliance times for the achievement of clean air standards in the polluted cities. To do otherwise is to invite chaos.

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Sex Preselection

In their article discussing the implications of sex preselection in the United States (10 May, p. 633), Westoff and Rindfuss assume that such techniques will be "effective, acceptable, and routinely used by women with a preference. . . ." This assumption is critical to understanding and forecasting the social impact of sex predetermination techniques. Yet, the authors give us no particular reason for accepting this assumption and, in fact, they themselves present contrary evidence, writing that "The current attitudes of married women suggest that a substantial proportion would be unfavorably disposed toward being able to choose the sex of their children . . . the possibility that such techniques would be infrequently used cannot be dismissed." Furthermore, the availability of a specific technique might also influence attitudes. There may be good reason to assume a different response to a choice between artificial insemination and a prophylactic chemical taken orally or by injection. Of importance here are the results of a study (*1*) (also cited by the authors) which found that many of those interviewed who initially supported the use of sex predetermination "did not like the idea of using artificial insemination techniques to choose the sex of their future children, however. Fully 50% defected from their favorable opinion; 17% changed to 'no,' while 33% moved to a 'not sure' position."

What this suggests is that in order to understand more fully the relationship between parental sex preferences, sex predetermination techniques, and the subsequent social impact, future survey research must obtain information relating to the expressed willingness of women (couples) to use a particular technique and the conditions under which such use is facilitated or impeded.

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References

1. G. E. Markle and C. B. Nam, *Soc. Biol.* **18**, 81 (1971).

Airships

Vaeth's suggestion (Letters, 3 May, p. 524) that we resurrect one of our colossal failures is surprising. Three dirigibles that were built by the U.S. Navy—the *Shenandoah*, the *Akron*, and the *Macon*—all broke up in what the Weather Service would now call mild turbulence. This 100 percent failure rate was somewhat embarrassing to the Navy and created numerous "investigations." It also demonstrated that, for the rigid-frame airship to be safe, the airframe would have to be as structurally sound as that of the conventional aircraft.

As a consequence, the Navy thereafter used only nonrigid airships, or blimps, which are not so susceptible to the occasional wrath of the sky. They

operated numerous blimps during World War II and continued research and development afterward. On 26 June 1961, the Navy ordered termination of the blimp program.

Vaeth's statement, "The airship's energy needs are accordingly low," would appear from available evidence to be incorrect. Resistance to forward motion through air is primarily produced by frontal area and airspeed. As a consequence, the great airships were and still are long on frontal area and short on speed.

The Goodyear Tire & Rubber Co. has been building and flying blimps for 48 years (*1*). They currently operate four. They follow each of these with at least one support truck and one bus to transport 15 or so ground-support crew. I suggest that parties interested in lighter-than-air vehicles as a competitive mode of transportation contact Goodyear before investing much time or money.

What appeared to be a good idea in Count von Zeppelin's day is still not economically feasible.

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Reference

1. E. K. Gann, *Flying*, May 1974, p. 51.

The Creative Process

Although there are different perceptions of creativity, few are so pessimistic as those reported by Thomas H. Maugh II (Research News, 21 June, p. 1273). I would like to respond to several points.

It *is* possible "to create conditions that nurture preexisting creativity." Teachers at all levels are daily encouraging inquiry, challenging students to expand their intellectual horizons, and reducing the psychological barriers to both creativity and learning (*1*).

The ability to generate ideas *can* be altered. Brainstorming, attribute listing, and other divergent and convergent thinking techniques can be taught so that the individual produces more ideas (*2*). Further, I have seen hundreds of my own students increase their facility in idea production as a result of instruction, teacher expectancies, and their own growth in self-confidence. On the other hand, while it is possible to teach the principles of critical thinking, it is more difficult to convince people to practice self-criticism. This requires a state of emotional comfort with oneself that can evolve but cannot be taught.

The observation by Krebs that one must know which questions to ask is important. It implies, however, both the psychological freedom to ask questions and some information on which to base them. Differences in ability and experience affect both factors.

In summary, creative ability lies on a continuum. It can be nourished in an atmosphere of psychological freedom or squelched by rigidity. It exists in many realms other than science and the arts and may be apparent in the youthful student as well as the famed adult.

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References and Notes

1. J. F. Feldhauser, D. J. Treffinger, S. J. Bahlke, *J. Creat. Behav.* **4**, 85 (1970); R. A. Goodale, *ibid.*, p. 91; T. Christie, *ibid.*, p. 13; E. P. Torrence, *ibid.* **6**, 114 (1972).
2. Doubters are referred to G. A. Davis, *Psychology of Problem Solving: Theory and Practice* (Basic Books, New York, 1973) for a summary of these techniques.

In his report on the conference to dissect the creative process in science and medicine, Maugh notes the participants' conclusions that "the ability to generate ideas is the innate part of creativity that probably cannot be altered," and that "creative science" cannot be taught in universities.

These comments are similar to those of the sculptor Lee Mach in the credo for her *Collected Works* (*1*). To the question "How does one assess the myriad influences that finally congeal to create a piece of sculpture, a painting, a song . . . is art really educable?" she answers, "Many artists, even those that teach, think not. Many creative achievements have been made by men and women with little if any formal education . . . formal education may tend to smother by the weight of precedent the intuition and initiative of the gifted one. . . . Artists no less than doctors, scientists, and educators need the conceptual foundation upon which to build their special expressive skills . . . education can help or hinder the abilities but cannot produce them."

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References

1. L. Mach, *Collected Works of Lee Mach* (Matu, Larchmont, N.Y., 1973).