Letters

Preventing Obsolescence

In his editorial "Continuing education" (12 Nov., p. 831) Abelson emphasized the value of short, intensive refresher courses as a means of combating professional obsolescence. He wrote primarily about the problem of maintaining technical competence, but also about the importance of preparing for broader responsibilities, presumably including those that are managerial. . . .

Government agencies are acutely aware of the problem, and many are taking advantage of opportunities to send their professionals to technical and managerial training courses both in and out of government. Periodically, the Office of Career Development of the Civil Service Commission conducts in Washington two 1-week seminars for small groups of senior government scientists and engineers. One is a study of the formulation of national science policies; the other is concerned with management of scientific and engineering organizations. Experienced key officials from the executive and legislative branches and from universities, foundations, and industry serve as discussion leaders. Another 1-week program on management is given for mid-career professionals, and there is a 3-day orientation for those just beginning scientific and engineering careers. During the few years these courses have been offered, several hundred people from a wide variety of agencies and programs have attended, and the response indicates that most of them considered the time to have been well spent.

Similar short courses are conducted by the Commission's regional offices and its Executive Seminar Center at Kings Point, Long Island, and by government agencies engaged in scientific research and development. In the aggregate, the federal effort to assist groups of its own professional specialists to reinforce and extend their executive qualifications would seem to be a significant step toward both improving the management of government R&D and providing a more congenial environment for the individual.

MEL H. BOLSTER
Office of Career Development,
U.S. Civil Service Commission,
Washington, D.C. 20415

. . . It is my experience, based upon many years in engineering as well as education, that the principal means of maintaining professional competence in a fast-moving field is the experience and new knowledge gained through professional practice at a high level in challenging areas. This view is supported by many people in industry. It is brought out vividly in a preliminary report of the Joint Advisory Committee on Continuing Engineering Studies, sponsored by the Engineers Council for Professional Development, the Engineers Joint Council, the American Society for Engineering Education, and the National Society of Professional Engineers.

A number of universities, particularly Northeastern University in Boston, the Polytechnic Institute of Brooklyn, and the University of California have addressed themselves energetically and successfully to the problems of continuing education for scientists and engineers. For many years their efforts have made a significant impact on their local industrial communities. These programs are in addition to the numerous graduate programs for scientists and engineers who are interested in an advanced degree. In the Boston area alone, there are 16 educational institutions that offer classwork in virtually every area of knowledge, at all reasonable hours of the day and night and at all levels.

Our state-of-the-art courses are designed to provide practicing scientists and engineers with knowledge and techniques that are in most instances at the very frontiers of technology. Our courses are given by the leading contributors in the area, who are drawn from industry as well as the neighboring institutions. We also give courses in company plants, tailored to the specific needs of company personnel.

I. KATZ
Center for Continuing Education,
Northeastern University,
Boston, Massachusetts 02115

. . . Abelson says, "Scientists and engineers have been less vigorous [than the American Medical Association] in meeting the challenge of obsolescence." I recommend that he look into the enormous number of engineering conferences and meetings that are held at all levels. . . . Another way of "instilling the essence of new knowledge" is by means of postgraduate courses. Rensselaer Polytechnic Institute of Troy, New York, set an example 10 years ago by establishing the Hartford Graduate Center of Rensselaer Polytechnic Institute of Connecticut, devoted to studies in the physical sciences and management for engineers, researchers, and managers who work full time in the industrial laboratories in the neighborhood. As the majority of the teachers belong to the part-time faculty and work full time as researchers in industry, their knowledge is firsthand.

With the introduction of integrated circuits only a few years ago, electronics entered a new and revolutionary phase, microelectronics . . . in which change has become a permanent feature, necessitating continual reevaluation and reeducation. It may be of interest that a regular course in Microelectronics–Integrated Circuits was instituted at the Hartford Graduate Center of R.P.I. in the 1964 spring term.

P. R. AMLINGER
Hartford Graduate Center of
Rensselaer Polytechnic Institute,
Hartford, Connecticut

. . . The American Geological Institute, as well as many of its member societies, has developed active continuing-education programs. Two short courses sponsored by AGI were held in conjunction with the annual meeting of the Geological Society of America in November 1965. They were eminently successful. Plans are now under way to initiate other courses to

precede the spring meetings of the American Association of Petroleum Geologists. The GSA and the AAPG are the two largest societies of geologists, and many of the smaller geological organizations meet concurrently with these two groups.

In addition to short courses, a series of review articles is under development each of which will, in a few pages, outline basic theory, detail new developments, and cite the most important references on various specific geologic topics. This series will appear in the *Journal of Geological Education.*

Information about other programs being developed by AGI can be found in an editorial in the September 1965 *Geotimes.*

WILLIAM R. MUEHLBERGER
Department of Geology,
University of Texas, Austin 78712

More on Extrasensory Induction of Brain Waves

Science has published a number of articles that were highly critical of ESP research in the past. I am therefore rather surprised at the publication of Duane and Behrendt's report, "Extrasensory electroencephalographic induction between identical twins" (15 Oct., p. 367). The research described by Duane and Behrendt fails to meet some elementary criteria for parapsychological research, and I am certain that the report would have been rejected on first reading by all of the four reputable parapsychological journals (*1*).

The reported experiment has three major flaws. First, with only a single wall and 6 meters of space separating the subjects, the "receiving" twin may have been responding (subliminally?) to the experimenter's voice as he instructed the "sending" twin to open and close his eyes. Second, "gross inspection" as a means of scoring data in such a controversial area is obviously unacceptable. Third, the authors do not report even the most basic sort of descriptive data, such as number of trials under various conditions, much less any objective, statistical tests of their results.

Duane and Behrendt note that they will not draw any conclusions "because of the paucity of controlled data, contrasted with the voluminous controversial information available on the subject of extrasensory perception." The authors have not added further *controversial* data with such an inadequately controlled study, and they overlook the existence of a number of well-controlled studies of psychophysiological responses to ESP (*2*).

Speaking as a psychologist who is familiar with the reputable ESP literature and who has done some minor studies in the field, I feel the readers of *Science* should realize that Duane and Behrendt's report is below the usual standards for ESP research . . . and should not be taken as at all representative.

CHARLES T. TART
University of Virginia Hospital,
Charlottesville

References

1. *Intern. J. Parapsychol.; J. Amer. Soc. Psychol. Res.; J. Parapsychol.; J. Soc. Psych. Res.*
2. D. Dean, *J. Soc. Psych. Res.* **41**, 351 (1962); C. Tart, *Inter. J. Parapsychol.* **5**, 375 (1963); J. Woodruff and L. Dale, *J. Amer. Soc. Psychol. Res.* **46**, 62 (1952).

. . . One unfortunate consequence of the publication by *Science* of Duane and Behrendt's report is its being selected for emphasis in popularizations of current scientific papers. I heard one science report on a major network radio broadcast in which this paper was singled out, as well it might be. The nonscientific public seems to be constantly on the lookout for evidence that nonphysical forces pervade and influence events. Such reports are eagerly received and their content exaggerated.

GEORGE M. ROBERTSON
Grinnell College, Grinnell, Iowa

A few additional facts about our experiment are hereby provided in answer to questions raised by a number of readers (Letters, 3 Dec.).

The twins were not in shielded rooms; conceivably they could have sent coded signals to one another. Neither they nor our technicians knew what we were testing. Induction, when present, occurred in both directions. Irregular eye-opening and -closing periods of 5 to 30 seconds were established on command. The command was either a whisper or a tap on the shoulder. The subjects were closely monitored to insure that they were following instructions. The event marker (in the later experiments) was inaudible. In the successful twins transmission seemed to occur always. The first set of twins was tested on only one day, because immediately thereafter