Letters

The Lie Detector

As a research polygrapher (psychophysiologist) whose protest against commercial lie-detection practices (*1*) seems to have contributed to recent state legislation and the House subcommittee hearing, I was greatly pleased with Elinor Langer's comprehensive report on this problem (News and Comment, 24 Apr., p. 395). Several of the criticisms of commercial practice need emphasis and clarification.

1) Operators' claims that an innocent person has nothing to fear are sheer nonsense. Langer cites one example to the contrary; there must be many such "false positives." The use of polygraphs as lie detectors is based on the assumption that deception will be accompanied by a unique pattern of physiological changes; but other factors than lying or guilt often produce very similar physiological reactions. Moreover, the baseline—the level of physiological activity of the person being tested—is a shifting one, so that in order to judge the magnitude of physiological response to a particular question it is necessary to know the level just preceding. The commercial operator typically uses equipment and techniques of analysis that do not measure this or take it into account (*1*). The operator must decide how large a response to a question he will designate as "guilty." If he sets this point too low he will judge too many persons to be guilty. If he sets it too high, so that only extreme responses are considered important, he will overlook evidences of guilt. In the "compromise" evolved through experience he will have a certain percentage of both errors. This is true of all psychological testing and all selection procedures.

2) These errors of classification, false positives and false negatives, render operators' claims of success meaningless. False positives, persons erroneously judged guilty, are rarely given an opportunity to demonstrate their innocence in governmental and industrial screening. And the false negatives, or undetected guilty persons, are hardly likely to disclaim the badge of innocence awarded them. Consequently, operators *cannot know* their own accuracy, and only data utilizing an independent criterion, for instance, verified confessions or proofs of innocence, can be respected. There simply are no such data on commercial operators' success. In fact, a beginning is only now being made on the detection of deception in the laboratory situation (*2*).

3) There is an apparent reluctance among many of us to discuss the moral issues involved. We seem to be embarrassed about stating publicly what we sense is wrong with this commercial practice, as if to do so would place us on the side of guilt and crime! I assert that the commercial practice of lie detection, quite apart from its technical defects, is immoral for these reasons: an individual is persuaded by social pressures ("You want the job?" "You got something to hide?") to testify against himself; on the basis of this "testimony" he may be denied the right to work but without ever knowing why; he may be "convicted" of certain "tendencies" without having committed an illegal act ("He gave a whopper when I asked him if he was homosexual"); he has no defense against the operator's report, since it is unknown to him and he has no rights in the process by which it is drawn up and used. In short, a person's privacy is forcibly intruded upon, and he is placed in the position of having to prove his innocence in an extrajudicial procedure, and this in connection with major issues in his life.

I urge all my colleagues—psychologists, psychiatrists, physiologists, and others doing research using the polygraph—to inject their expert opinion into local and national debates on the use of this equipment. It is part of our social responsibility to do so, and the issue involves our area of competence.

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References

1. R. A. Sternbach, L. A. Gustafson, R. L. Colier, *Harvard Business Review* **40**, 127 (1962).
2. L. A. Gustafson and M. T. Orne, *J. Appl. Psychol.* **47**, 408 (1963).

The review of the use of the "lie detector" raises some interesting possibilities. Since so many government agencies have adopted use of the polygraph and since Congress has undertaken financial support of its use, it seems likely that the taxpayers must soon request a return on the investment. This being an election year, the first thing that suggests itself is a nationally televised series of "great debates"—perhaps under the title *Meet the Polygraph*—during the conduct of which the presidential candidates (wired and taped, insofar as make-up requirements permit, to a huge polygraph serving as backdrop) state their views and are debated and interrogated by opponents and reporters.

Similarly, public demand may require that the speeches of legislators be distinguished in the *Congressional Record* according to whether delivered under polygraphy or not.

With popular approval of polygraphy extended to the pinnacle of the executive and the flank of the legislative, it might be hoped that adoption of the practice would develop in the information industry. For example, the public might view with most esteem those editorials in the national news magazines appearing under the imprimatur DUPED (Delivered Under Polygraphic Editorial Dictation).

Sooner or later there should be an announcement (perhaps a RAND report) on what the Russians are doing in this field. At that time the Soviet effort will be countered by the creation of an appropriate national agency (say NAPA, the National Analytical Polygraphy Administration). Such an agency would begin by letting contracts for scientific research to several of the larger universities. Although the main needs (and hence most of the

money) would be considered to lie in the engineering and physical sciences (refinements in technology, miniaturization, and so on), an impressive number of contracts would be let to the social scientists, with a view toward dampening adverse activity but also with prospects of valued results (for example, the determination of polygraphy-resistant subjects).

Given a strong international competition, the government may be relied upon to preclude the embarrassment of a "polygraph gap" until private industry has had a chance to develop adequately to meet the burden (indicated by the presence of Poly Tell & Tell's lobby in Washington). At that point the process of polygraphization will be complete. There will remain to be awaited only the great powers' next confrontation—with polygraph.

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Hazards from Mercury Burners

For nearly 11 years I have been a regular reader of your journal. It gives a picture of the present state of the various lines of research, although more specialized periodicals have still to be consulted. . . . The Letters section shows that there is among scientists a strong desire to find the truth and to point out facts which did not come to the knowledge of the authors of the various articles. Also a good portion of humor can be found in this section.

But what I want actually to commend is the letter of V. A. Phillips and J. A. Hugo (13 Mar., p. 1120). This contribution in its way is unique, since the authors feel it worthwhile to alert fellow scientists to possible dangers in working with electron microscopes. This is a very promising sign of cooperation, and the two research workers should be congratulated for this.

On the other hand, it should be an opportunity for the editors of *Science* to encourage scientists working in different fields of research to bring similar cases and problems to the notice of their colleagues. I would mention the hazards arising from stray irradiation from the high-energy mercury burners used in fluorescence microscopy, especially when the work is carried out for very long periods and the consequences of exposure to strong ultraviolet light become obvious only after several days; also the development of the poisonous gas ozone during work with high-pressure mercury burners and lamps in fluorescence microscopy, fluorimetry, and fluorescence chromatography.

I feel that *Science* could give an example to practically all other scientific journals that cooperation can still be improved among scientists.

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Black Magic?

We have been reluctant to point such a devastating finger at *Science*, but the most objective analysis of the data compels us to implicate *Science* in a clear-cut case of cause and effect. Four weeks of analysis by the most modern computer system proves irrefutably that the occurrence of the earthquake in Alaska on 27 March, the very day that *Science* featured an article on major earthquakes (H. Benioff, "Earthquake source mechanisms," p. 1399) was no mere coincidence.

If you intend again to feature something on earthquakes, or interplanetary collisions, or anything of that nature, please inform us so that we may better prepare ourselves for the event.

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Indexes to Our Journal

At the bottom of your contents page you state that "*Science* is indexed in the *Readers' Guide to Periodical Literature*." According to *Ulrich's Periodicals Directory* (10th edition, p. 445), your journal is indexed also in *Biological Abstracts, Chemical Abstracts, Engineering Index, Index Medicus, Mathematical Reviews, Nutrition Abstracts and Reviews, Psychological Abstracts*, and *Science Abstracts*.

Readers' Guide is found in almost every American library, and since it is less specialized by subject than the other indexes mentioned, it no doubt indexes *Science* more completely than they do. It is only an index, however, whereas some of the other indexes are also abstracts. *Readers' Guide* has only an author-and-alphabetical-subject-heading approach to the material; *Chemical Abstracts* and *Biological Abstracts* have additionally between them formula, systematic, and permuted-title indexes, as well as a more scholarly subject approach, to supplement the popular *Readers' Guide*. Also, some of the abstracts provide photocopy service; although this feature is not so important for *Science*, which is in plentiful supply about the nation, as it is for scarcer items, it might still be of use from time to time.

Ulrich's does not mention the fact that the title pages of *Science* appear regularly in *Current Contents* (which has a service providing tear sheets of articles).

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University of California: Addenda

As one who for 62 years has been in various fashions associated with the University of California, I should like to enlarge on the brief historical note in John Walsh's article about the University of California (News and Comment, 3 Apr., p. 34). . . .

President Benjamin Ide Wheeler . . . brought Jacques Loeb, W. J. V. Osterhout, and others to Berkeley. . . . There was already the nucleus of a strong faculty on the campus through the association with the distinguished astronomers at Lick Observatory and A. O. Leuschner at Berkeley. In geology and paleontology there were A. W. Lawson, C. D. Louderback, and C. W. Merriam; in botany, W. A. Setchell and W. P. Jepson; C. A. Kofoid in zoology, E. J. Wilczynski in mathematics, A. E. Taylor in pathology, A. L. Kroeber in anthropology, G. M. Stratton, H. A. Overstreet, and Morton Prince in psychology, W. C. Mitchell in economics, John G. Howard in architecture, and C. E. Derleth in civil engineering. Wheeler augmented the humanities by adding distinguished philosophers, economists, and historians. It was this faculty of able scholars and men of strong character