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

that, after the disorganization created by World War I, achieved teamwork with administration and regents by means of the academic senate, with its advisory committees on budget, on research, and especially on faculty appointments.

It is true that after Osterhout, Taylor, and Loeb left, the faculty was strengthened by the acquisition of G. N. Lewis. His influence was indeed great, but that would have been to no avail without the strong support of the existing faculty and the outstanding organizing ability of one of the truly great presidents of the university, the astronomer W. W. Campbell, who followed Wheeler after an interlude of three or four years and was president from 1923 until 1930; he is not mentioned by Walsh. Campbell was appointed with the approval of the academic senate and the faculty and did as much to start the university on its upward path as any other president. In this he was ably aided by the astronomer A. O. Leuschner, whose influence was fully as great and in many ways less erratic than that of G. N. Lewis. It was as a result of the efforts of the physicist E. P. Lewis and of Leuschner that Birge and other active founders of the physics department were brought to Berkeley. It was Campbell, not Sproul, who brought Ernest O. Lawrence to Berkeley.

Probably most of the important decisions that led to the later trends of the university's growth were made by Campbell. It was under Campbell that the decision was made to open a branch at Los Angeles in response to southern political pressure. It was Campbell who built up the strong scientific departments at Berkeley and U.C.L.A. Campbell strongly supported the Scripps Institute of Oceanography. Under Campbell the visiting lectureships instituted by Wheeler were resumed. Campbell also strongly supported the board of research and utilized the senate committee set up before his advent. He added institutes of advanced study and broadened the fields of study in the university.

Thus when Sproul took over the presidency in 1930, the university was well organized internally and had a scientific faculty destined to lead to the eminence that the university has now achieved. This does not in the least belittle the great contribtuions made by President Sproul, who faced entirely different and, in a sense, more trying problems. He inherited an already potentially famous institution from Campbell and furthered its continued growth. Above all, he kept a single, unified state university going and growing over the most serious political opposition of pressure groups.

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Leadership in Macaque Societies

The word "leader" has a clearcut meaning in common English: one who leads or precedes another individual or a group and thus determines the direction of movement of the pair or larger group.

All accounts agree that the males in societies of the various macaque species are organized into a definite dominance hierarchy which regulates social distance and relative location of members of a group. As a group moves on ordinary occasions, the most dominant male is found near the center, immediately surrounded by females and immature animals, and with subordinate males spaced out around him at a longer distance. Those that take the lead are the subordinate males, or, occasionally, an old female.

The dominant male may take the lead on rare occasions, as when he attempts the rescue of a captured infant and is followed by the band (*1*). Occasionally, he may take a different direction from that of the preceding animals, in which case they retreat and get out in front again. When there is a conflict between groups, he maintains his central position.

To speak of this animal as "the leader" and the subordinate males as "subleaders" (*1, 2*) is to give a misleading picture of social organization. Such an animal is definitely the alpha male in the dominance hierarchy, a general relationship, but his role in the leader-follower relationships of the band is much more special. He exercises some control over the movement of the band, and in special cases may take the lead, but in most cases the group is led by others.

Leader-follower relationships within the band should be analyzed with the same care and detail as the dominance-subordination relationships in order to obtain a true picture of social organization. Present evidence indicates that leader-follower organization is less definite and more complicated than dominance organization. If a term is desired to describe the total role of the central male, it should be one which is either neutral in meaning or which is accurately descriptive. In any case, it should not have anthropomorphic connotations.

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1. G. B. Koford, in *Primate Social Behavior*, C. H. Southwick, Ed. (Van Nostrand, New York, 1962).
2. D. Miyadi, *Science* **143**, 783 (1964).

Great Men

Sir Gavin de Beer's tribute to George Gaylord Simpson in your issue of 20 March (Book Reviews, p. 1311) is a cause of deep gratification to me, as it must be to many others. In justice, however, to the memory of another great man referred to in that review, William Bateson, with whom I had the honor of working briefly in 1922, it seems only fair to quote from his memorable address to the American Association for the Advancement of Science, in Toronto, December 1921 [*Science* **55**, 57 (1922)], acknowledging the consequences of his visit to Morgan's laboratory at Columbia. [De Beer said in his review, "The 1920's were a bewildering period for biologists. A year after the publication of T. H. Morgan's cast-iron proof that genes are carried in linear order on the chromosomes, I remember arguing with W. Bateson, who refused to accept it. . . ."]

. . . For the doubts—which I trust may be pardoned in one who had never seen the marvels of cytology, save as through a glass darkly—can not as regards the main thesis of the Drosophila workers, be any longer maintained. The arguments of Morgan and his colleagues, and especially the demonstrations of Bridges, must allay all scepticism as to the direct association of particular chromosomes with particular features of the zygote. The transferable characters borne by the gametes have been successfully referred to the visible details of nuclear configuration.

The traces of order in variation and heredity which so lately seemed paradoxical curiosities have led step by step to this beautiful discovery. I come at this Christmas Season to lay my respectful homage before the stars that have arisen in the West.

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