slaves in their own land. Those "increased responsibilities" will only allow Africans to supervise Africans, and those "drastically increased salaries" are still below subsistence and are still totally unjust for work performed. The scholarships and educational changes are for the continuance of apartheid. Polaroid's new policy is in violation of the resolutions of the United Nations and the International Declaration of Human Rights.

It is high time that liberals and self-professed humanitarians stop talking, and perform deeds that will meet human needs and deal with those crimes against humanity that they promote or ignore. Blacks will no longer accept the excuse that education or jobs will buy human rights—both here and in South Africa.

Caroline Hunter
Boston, Mass.

Polaroid scientists comment: Caroline Hunter repeats many of the allegations we took pains to respond to in our letter. She and her colleagues proceed from a specific assumption about how the apartheid system should be fought: namely, by an international economic boycott of South Africa. This position has led her to impugn Polaroid's motives in the experiment, and to construct an elaborate series of fabrications about Polaroid's situation in that country. For instance, she publicly asserted for months that the passbook photographs were all taken with Polaroid's ID-2 identification system. This particular unfounded charge is now absent from her letter, and she has shifted to saying that "all passbooks are produced on instant film." In fact, as we pointed out previously, the company's investigation in January, 1971, found that no more than 15% of the passbook photos were being made on Polaroid film. Only six of the more than 150 passbook offices were equipped with instant (but non-Polaroid) ID cameras that use Polaroid film. At that time, the company ordered the distributor to discontinue selling any Polaroid products to the South African government.

There are hundreds of US companies with substantial capital investments in South Africa. Polaroid has none. In view of the company's minute importance in the economy, and the small percentage of passbook photos made on Polaroid film, it seems unlikely that stopping sales to the South African distributor would materially affect the apartheid system. The "Polaroid Experiment" is an attempt to find, and demonstrate to other American companies, ways of combatting apartheid through improvements in the economic and educational status of South African blacks. Miss Hunter's insistance that Polaroid's experiment will not work seems premature at a time when all hypotheses for action against apartheid should be vigorously explored.

Stephen A. Benton, John J. McCann
Stewart W. Wilson, William R. Ray
Polaroid Research Laboratories
Cambridge, Mass.

Handicapped physicists

Your editorial, "No More Brains to Train?" in the April issue (page 91) could have gone further in discussing those groups that have been denied the opportunity to realize their full intellectual potentials in physics and other areas.

For example, how many deaf physicists do you know? I refer to those who have had severe hearing losses since childhood and not to those whose loss developed later in life. If I speak of the deaf rather than of other "handicapped" groups, it is a result of personal experience—I have been profoundly deaf since the age of seven.

Deafness can be devastating because it strikes at the sense through which most people learn speech and language and through which they usually communicate with others. With intensive training by well prepared and highly motivated teachers, deaf individuals, including those whose deafness is congenital, can learn language, speech, and lipreading and can be encouraged to develop their full potentials. The membership of the Oral Deaf Adults Section of the Alexander Graham Bell Association for the Deaf includes PhD's in several scientific fields and also an orthodontist.

Unfortunately, society has not devoted the necessary resources to providing the deaf with the teachers and educational facilities they require. The general educational level of the deaf today is appalling, and they face many prejudices. The ignorance of their capabilities and problems is perhaps best emphasized by the fact that your editorial and similar discussions never see fit to mention them among the groups whose talents are being only slightly utilized by society.

Ralph F. Guertin
Rice University
Houston, Texas

In defense of Velikovsky

Murray Gell-Mann in the May issue (page 23) linked the Velikovsky Theory with mysticism. This reasoning appears in line with what Gell-Mann calls "a surge of rejection of rationality." Since Velikovsky published his *Worlds in Collision* in 1950, irrational attacks on

J. J. Thomson

RCA PHOTOMULTIPLIERS WOULD HAVE FASCINATED THOMSON

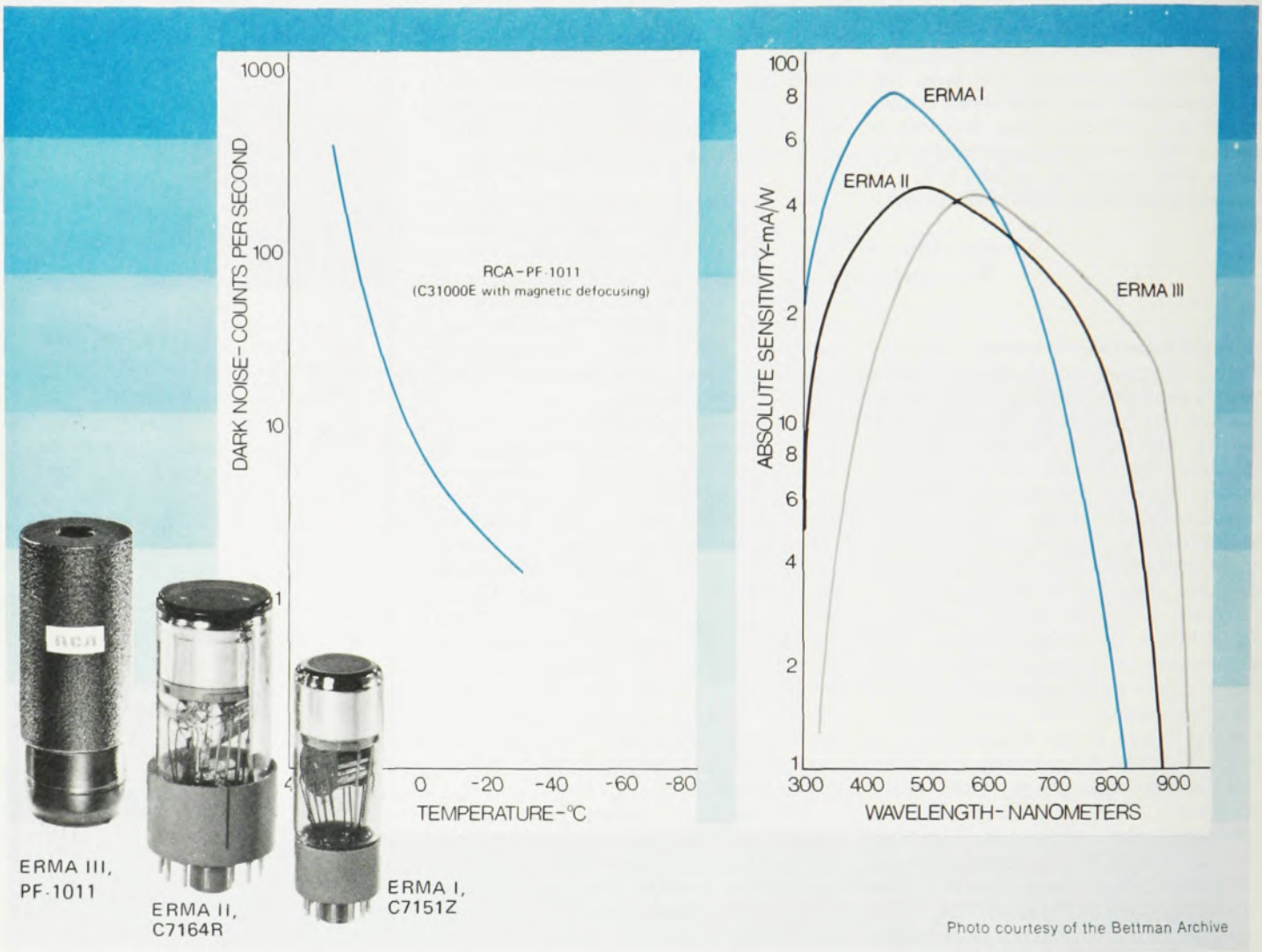

Photo courtesy of the Bettman Archive

Following hard on the fundamental discoveries of Hertz, Hallwachs, and Elster and Geitel, all of which profoundly affected the understanding of photoemission, the work of J. J. Thomson revealed the existence of the negatively charged particle – the electron – as a constituent of all matter. The year was 1897.

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his methods and credentials have been made by numerous scientists, but rational analysis of and supportable scientific arguments against Velikovsky's theory have been conspicuously absent.

Some of the few original nonemotional arguments against Velikovsky were statements such as: (1) electromagnetic fields play no important role in the solar system; (2) Venus is cold; (3) Jupiter does not emit radio noise; (4) the last ice age ended at least 25 000 years ago; (5) the sun can have no excess charge; (6) petroleum is not found in recent sediments, and (7) petroleum cannot be formed by the interaction of comets and planets. The errors of (1) through (4) are now obvious. Refutations of the others have been published as follows: statement (5)—V. A. Bailen;[1] statement (6)—P. V. Smith;[2] statement (7)—J. Oro and J. Han.[3]

The writings of Velikovsky involve in intricate detail a new approach to the recent history of the earth and solar system. The scientific evidence necessary to support or disprove this theory is decidedly in favor of Velikovsky. When open discussion is allowed such as in *Yale Scientific Magazine* (Vol. XLI, no. 7, April 1967) the logic and support of Velikovsky's theory becomes apparent.

I would like to suggest that this theory be carefully examined and that documented discussion for and against this theory be allowed in scientific literature. We should no longer permit emotional arguments to direct scientific thought.

References

1. V. A. Bailey, Nature **186,** 508(May 14, 1960); **189,** 43(Jan. 7, 1961); **189,** 994(March 25, 1961).
2. P. V. Smith, Science **116,** 437(Oct. 24, 1952).
3. J. Oro, J. Han, Science **153,** 1393(1966).

C. J. Ransom
Ft. Worth, Texas

Science newspaper needed?

Your editorial "Physics Forty Years from Now" (June, page 80), brings up the question "Is a national decline from achievement to consumerism inevitable?" If it isn't, how can it be avoided? One answer may be along the following lines. Many scientists are goaded into productivity by their own imagination or curiosity: They can envision intellectual goals for their efforts. Likewise, many young people find challenges in sports. It is a well-known law in human nature that before responding to a challenge, the challenge has to loom large in the imagination. If the nation is to feel challenged, someone has to create and dramatize the challenges and this is probably the most important of all roles in society. In the past 30 years the public imagination has been excited by atom bombs, nuclear power, man-on-the-moon, and practically nothing else! This means the nation now has a crisis in lack of imagination. Who should stir that imagination? The Politicians? The Clergy? The States? The HEW department? The Military? . . . Unless the public imagination is stirred and challenged, then David Riesman's third phase of decline into consumerism is probably inevitable. One suggestion is that the scientific community itself should take up the prime responsibility for stirring the public imagination.

It is reasonable to say that the public lives in a world which is as much technological as it is political. Whereas the political news is dramatized and issued 24 hours a day, the technological news is rarely found or well dramatized, except when it is involved in disasters. One remedy to this situation could be a technological newspaper written and illustrated for the general public. Such a newspaper could be created as a joint venture by all the established scientific associations, institutes and so on. (If they don't do it, who will?) Previously, our scientific societies have been concerned with their own members. Today they also have the duties of communication and of exciting the public imagination with the challenges and benefits from science. A science newspaper is one of the better ways of attempting to do this. Perhaps readers can suggest other ways.

John Kirkbride
Applied Research Laboratories
Goleta, California

More on job picture

In the December 1970 issue of *physics today* we advertised: "TENURED POSITION. Preference given to biophysicists and astronomers." This was repeated in the January issue. As a comment on the employment situation I should like to give the number of replies. Actually, we do not know *exactly* how many replies we received, because some letters did not mention our notice in *physics today*. It soon became evident that a form letter of reply would be necessary and 500 copies were ordered. Most of these were used and in addition some applications required special replies. We believe that 500 is a reasonable estimate of the number of applications considered.

If one hour were spent in evaluating each application, that would mean 500 hours, or twelve 40-hour weeks. Even though several men in our physics department were involved this turned out to be a considerable undertaking. We wish to apologize to any applicant who did not receive proper consideration—

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