on Electron Devices presenting a sophisticated nonlinear theory of the traveling-wave tube interaction. I am sure there are also magnetron engineers who would be upset if they heard that someone was "reviving" the magnetron.

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Jobs in college teaching

Readers participating in the college physics-teaching job market might be interested in some observations and results from my year of seeking a job. These are addressed to faculty search committees as well as to applicants for jobs.

During 1975–76 I found about 60 teaching positions to apply to in four-year colleges. These schools variously reported from 100 to 400 applicants for each position, so statistically the chances were not good. Community colleges are apparently not publicizing their positions in many media seen by physics teachers, as I found only about ten positions to apply to in community colleges.

The dignity of applying for a college physics position is being eroded. A few four-year colleges, and most two-year colleges, have application forms to fill out, including questions redundant with the resume, questions inappropriate to college teaching, and some questions that appear to violate stated Affirmative Action goals. Some schools process applications through a central office, and the applicant cannot correspond with the department in which he or she wishes to work. Some schools are still giving red-carpet treatment to visitors, but some cannot provide all travel expenses nor feed visitors.

Approximately 40% of the four-year college positions ask for letters of reference to be submitted with the initial application. Because the job search is long, this procedure eventually fatigues one's referees, and the quality of letters is sure to diminish. I see no pattern as to which schools require letters early. I suggest a uniform policy of requesting reference letters only when a candidate reaches that small group of applicants who are to be invited to visit. I also wonder whether colleges are promptly informing applicants if promised letters and other materials are not being received, so that the applicant may take further steps to complete his application file.

Rather than be unemployed in my profession, I would accept in many cases a half-position. I know of no college offering positions split into two parts so that two people may work where one did before. The increase in productivity would more than compensate the increased overhead.

When I was at the New York meetings and placement service in February 1976, I wondered if the four-year colleges selecting for trained and accomplished physics researchers to do only teaching would be satisfied for long. If only the busy interviewers could have attended the many fine AAPT sessions concerned with improving the teaching of physics! Several years ago when I planned my career in physics education, I had thought great changes in higher education were starting to occur, but progress is much slower than I expected.

The applicant for a teaching position usually receives a rejection in the form of a short mass-printed letter with vacuous and/or ridiculous statements of praise and hope. This is unpleasant, but avoids litigation I suppose. It would be nice to receive brief but explicit feedback as to the nature of the mismatch between position requirements and applicant's qualifications. Many colleges have stated that I do not fill the requirements although I felt I filled every letter of them. More successful applications might result from my knowing more precisely what schools are looking for. Alternatively, better feedback could guide me in altering my career plans.

Finally, I would like to praise the AIP Placement Service for their efficient and very vital assistance to physicists seeking academic positions.

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Lightning experiment danger

Many readers probably did not realize that in your July issue, figure 2 on page 24 represents a successful and crucial experiment inspired by Benjamin Franklin and installed by Thomas Francois Dalibard at Marly-Le-Roi a few weeks before Franklin obtained similar results with his famous kite. Moreover, in the same issue, John L. Heilbron's very interesting and otherwise well documented article "Franklin's physics" is perhaps somewhat misleading concerning Dalibard's experiment.

My remark is based on the accounts given by most reputable authors (for example, B. Schonland, J. A. Chalmers, H. Prinz) and also on the knowledge gained during our artificially triggered lightning experiments, performed jointly by the Commissariat à l'Energie Atomique, Electricité de France and the Centre National d'Etude des Télécommunications (see *Nature* **257,** 212, 1975).

Heilbron states that wise caution was the reason Franklin did not himself try the dangerous insulated-rod experiment.

In fact, in the light of modern knowledge, it appears that Franklin's kite experiment (curiously not mentioned by Heilbron) was at least as dangerous as the insulated rod used by Dalibard or by G. W. Richmann. The tragic death of the latter must not obscure the fact that among the imprudent amateurs of either technique the number of casualties has been surprisingly low. Nowadays we know that this fortunate situation is related to the observation that static collectors (rods, kites, tethered balloons) usually produce only minor discharges (see M. Brook et al, *J. Geophys. Res.* **66,** 3967, 1961) and the probability of a powerful lightning occurrence is not very high. This observation is confirmed by the fact that the kite string can usually sustain many discharges without damage, in contrast with what is observed when using the rocket and wire dynamic-triggering method.

Heilbron writes "Buffon's agents, sharing Franklin's caution, did not expose themselves to thunderbolts either. They engaged a retired dragoon to draw the sparks." Having myself spent many months in the expectation of conveniently electrified clouds above my head, I am more inclined to believe that this arrangement was dictated by the necessity of conciliating time-consuming scientific research with other social and professional obligations. It is difficult to imagine that Dalibard's experiment would have been repeated in the presence of royal representatives a few days later if any great danger was anticipated.

Nowadays, extensive and costly precautions are required before the safety officers of research institutes give the green light for lightning experiments. These precautions are certainly not superfluous (see *Nature* **260,** 188, 1976) but the eighteenth-century physicists had little possibility of evaluating the danger. The well deserved fame of Franklin is not lessened by the remark that he ran a risk as did other great physicists who pioneered in fields such as x rays or natural radioactivity.

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Teaching physics applications

There have recently appeared several letters on the subject of applied or practical physics. As I believe that this subject deserves much attention and evaluation I would like to add another point of view. The current method of teaching physics to physics majors is to use a lecture–laboratory sequence. In the lecture, basic concepts in physics are discussed, while in the laboratory these principles are made clear. Where we fail is that the laboratory emphasizes the *principles* of physics as opposed to the *application* of physics principles. As a result, many students move through their college education without the feeling of achievement or purpose. They cannot visualize in what way they are developing