continued from page 15

cal or conceptual errors, or which makes the error specifically mentioned above. The elimination of this type of work will serve to raise standards throughout the community and encourage quality research.

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10/17/77

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# Management by objectives

I was interested to read Frederick Rothwarf's and Arthur Tauber's recent letter (August, page 13) concerning their proposed managerial uncertainty principle as a panacea for overzealous bureaucratic regulators. While their objectives have considerable merit, their last sentence associating "management by objectives" with accountability-overregulation is at best a non sequitur. Their management uncertainty-like principle rather than moderating "management by objectives" (MBO) framework should actually enhance it.

Basically, MBO,1 whether employed singularly or collectively, is a process of establishing an overall organization goal and a series of time-dependent subordinate goals, developing intermediate objectives to a given goal and then successively accomplishing each of these subordinate objectives with the end result being goal accomplishment. After a specific secondary goal has been accomplished the MBO doesn't cease to exist. On the contrary, the process is an iterative one, in which specific goals are accomplished, new goals are established, and old goals are refined and modified. This cyclic process properly utilized can provide a logically ordered framework within which creativity need not be stifled, but rather, nurtured and cultivated into a unique mechanism that provides original and innovative solutions to difficult tasks.

MBO was never intended to be its own self-serving end, but a system that encourages all participants to conceive or invent new methods to accomplish their own subordinate task. However, managers must permit their subordinate managers to establish their own objectives consistent with the previously established goals. It is precisely this concept of delegation of responsibility that is the key to encouraging creativity within an organization. Disregarding this can lead to management by minute detail. Certainly, MBO requires effective communications between a project manager and his subordinate managers; indeed, the opportunity for positive feedback and active participation of subordinate managers should be strongly encouraged in determining future courses of action

toward a goal. Succinctly stated, creativity can be and should already be an integral part of a successfully directed MBO approach or framework to scientific advancement and achievement.

### Reference

 T. M. Tobin, "Company Management by Objective," Logistician, Vol. 8, No. 5, Sept— Oct 1976, pages 8–10.

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## Cost of tenure

It is well known that financial stringency at universities, caused by declining enrollments and declining government research funding, has virtually halted the hiring of new young faculty. It is also commonly realized that the absence of young faculty is leading to a decline in research vitality, particularly in the development of innovative new ideas. However, many people fail to realize that this very situation further worsens the financial condition of the universities involved simply because all things being equal, older faculty members are paid more than younger ones. A tenured full professor may be paid more than twice as much as a recently hired assistant professor, even though the older person has an equal teaching load, a declining research productivity, but perhaps a greater contribution to the tedious administrative committee work on which the functioning of any modern university depends. (This is one more example of Murphy's 6th law: "The more productive you are, the less you are paid. The ultimate example would be the fellow who is so productive that he is fired because the senior members of his organization see him as more of a threat than an asset). It is clear that universities must find some way to replace older, non-productive tenured faculty members with bright young people, if they are to survive financially as well as intellectually.

ROBERT JOEL YAES
Memorial University of Newfoundland
10/11/77 St. John's, Newfoundland, Canada

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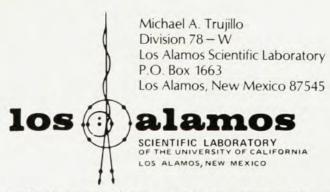
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siles on the ground. Without something close to radar-controlled automatic launch, a war can be lost in about half an hour. Soon, even the submarines hiding beneath the polar ice may not have time to await a Presidential decision to retaliate.

And yet radar automatic launch is a tactical nightmare. Sooner or later, a meteor swarm or some similar error would trigger an unintended holocaust.

There are only two alternatives to such an intolerable situation. Either all the missiles must be disarmed or they must be separated by much greater distances. Although no place on Earth is far enough away, the Moon is several days from an pre-emptive strike from Earth and the first O'Neill space colonies will be at similar distances. Military logic now demands either that we disarm immediately or that the space colonies must be established as fast as is humanly possible. Either way, it is good news for humanity. Vast resources will become available for peaceful purposes or we shall be in space much sooner than any of us dared to hope. The road that leads via the space colonies to the stars will begin to open. With just a little luck, some of our children will have time to escape the lethal politics of the mother planet.

All we have to do to make sure that we get one or other (and perhaps both!) of these great gifts is to impress upon our politicians that radar automatic launch of nuclear missiles is not an acceptable, human option.

MALCOLM THACKRAY Stanford, California

10/27/77

## Corrections

November 1977, page 34, figure 3—The labels on the two blue curves, "Silicon avalanche photodiode, 0.82 microns" and "Silicon photodiode, 0.82 microns," should be interchanged.

November, page 63, third paragraph, line 9 up—line should read "gases, so that the higher transport to, and..." The editorial revision implied that krypton and xenon have a higher transport to, and deposition in, the human lung, whereas it is rather uranium, thorium and daughters in coal that have higher transport and deposition.

Page 63, fourth paragraph, line 7—line should read "... comparable in order to make the ..." The editorial substitution of "to coal hazards" makes the sentence erroneous. It is the radioactive hazards that are very roughly comparable, not the total hazards. It is the thrust of the author's findings that the total hazard of coal is orders of magnitude greater than that of fission.

December, page 26, column 3, lines 27/28—for "considerable stress" read "considerable success."