

letters

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.

DAVID EIMERL

Lawrence Livermore Laboratory

10/17/77

Livermore, California

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

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

THOMAS M. TOBIN

Lawrence Livermore Laboratory

10/11/77

Livermore, California

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

Disarm or space colonies now

With every application of advancing technology, military man is painting himself into a strange corner and, for the first time since the nuclear arms race began, there is hope for the future for the rest of *homo sapiens*.

Increasingly efficient surveillance and intelligence-gathering systems make it probable that each of the superpowers will soon know accurately the positions of nearly all the opponents' missiles. Increasingly accurate guidance systems make it possible to destroy all such mis-

THEORETICAL PRINCIPLES IN ASTROPHYSICS AND RELATIVITY

Edited by Norman R. Lebovitz, William H. Reid, and Peter O. Vandervoort

Originally delivered at a 1975 symposium honoring Professor S. Chandrasekhar at the University of Chicago, this collection of papers critically reviews current ideas in general relativity, theoretical astrophysics, and the region of their overlap

Cloth 288 pages \$23.00

February

The University of

Chicago Press

60637

CHICAGO

UNIFIED QUANTUM FIELD THEORY

By D. R. Conant

This book introduces a limit principle which is applied to three spatial dimensions, to time and to a scalar variable designated as "mass-potential" which is closely related to mass. Additional definitions and restrictions then lead to modern relativistic quantum mechanics and to a quantum theory of gravity obeying Einstein's general theory of relativity. This approach resolves the problem of singularities which has plagued physics for years and yields values that agree with experiment for the fine structure constant, the strength ratio of the gravitational to the electromagnetic force, and an upper bound at low particle velocities for the strength ratio of the weak to the electromagnetic force.

1978, 236 pp., \$24.50 cl., \$12.50 p.

LOS ALAMOS CONSULTANTS
2585 46th St.

Los Alamos, N.M. 87544

CAREER OPPORTUNITIES IN NUCLEAR SAFEGUARDS AT LOS ALAMOS

As a DOE lead laboratory in safeguards technology, the Los Alamos Scientific Laboratory is undergoing a major expansion of its broad-based program of design, development and in-plant test and evaluation of "near-real-time" materials control and accounting systems for safeguarding all types of nuclear facilities. In addition to ongoing basic measurement technology development and transfer, these activities include field demonstration and test and evaluation of new safeguards instruments and systems in existing and new DOE facilities, in U.S. commercial plants and, in the future (e.g., through possible cooperative bilateral/international R&D programs), in designated foreign and/or international demonstration facilities.

To meet these new R&D commitments, the Nuclear Safeguards Program at Los Alamos offers challenging career opportunities for scientists and support personnel in modern safeguards technology and materials management, including such activities as:

- materials measurement technology, R&D and applications
- NDA standards, calibration and measurement controls
- engineering liaison, in-plant test and evaluation
- instrumented test-loop development, process control R&D
- surveillance and verification technology, R&D and applications
- materials accountability and control
- safeguards subsystem development and evaluation
- fuel cycle integrated safeguards systems design
- modeling and simulation for safeguards effectiveness evaluation
- international safeguards, inspection/verification/assessment

If you have expertise and proven accomplishments in one or more of the above safeguards and materials management areas, you are invited to send a complete resume, in confidence to:

Michael A. Trujillo
Division 78 - W
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545

los alamos

SCIENTIFIC LABORATORY
OF THE UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO

An affirmative action/equal opportunity employer. Women, minorities, veterans, handicapped urged to apply. U.S. Citizenship required.

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
10/27/77
Stanford, California

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." □