PLENARY SESSION OF THE 104TH ANNUAL MEETING: ETHICS IN THE SCIENTIFIC PROFESSION AND TECHNOLOGY

The plenary session of the 104th annual meeting of the Tennessee Academy of Science consisted of five invited papers on the topic "Ethics in the Scientific Profession and Technology." Presentations were followed by panel discussion. Dr. Rubye Prigmore-Torrey, Tennessee Technological University, Cookeville, Tennessee, organized and led the session. Abstracts for the five presentations follow.

ETHICS IN SCIENCE AND SOCIETY: AN OVERVIEW. ***Rubye Prigmore-Torrey and Janet D. Thomas,*** *Tennessee Technological University, Cookeville, Tennessee.* The impact of scientific activities on society is discussed in light of the way scientists do things. The three most common facets of unethical behavior of which scientists may be found quilty are given with a discussion of each and, finally, how this behavior impacts society. Ethics, science, and society are defined, and an overview of the importance of ethical behavior in general is given.

ETHICS IN PHYSICAL SCIENCE. ***Jeffrey Kovac,*** *The University of Tennessee, Knoxville, Tennessee.* Scientific ethics, a subset of professional ethics, is discussed in light of the concept of a profession which is defined in terms of two bargains, one internal and one external, that are based on trust in human behavior. Five reasons for the breakdown of public trust in science are discussed. Arguments are made for teaching scientific ethics within the discipline using the case method.

ETHICS IN ENGINEERING AND TECHNOLOGY: WHAT TO TEACH AND WHY. ***Michael Davis,*** *Illinois Institute of Technology, Chicago, Illinois.* While the Illinois Institute of Technology has been experimenting for 4 years now with integrating professional ethics into technical courses in all fields, this paper will focus on what has been accomplished in engineering. Because professional ethics consist of special standards of conduct, they must (and can) be taught like other professional knowledge and, indeed, form a natural part of such teaching. There is no need to make major changes in technical courses to integrate ethics; many small changes are enough (e.g., re-writing of standard problems). Both students and faculty at the Illinois Institute of Technology have been very pleased with the results.

ETHICS IN THE COMPUTER AGE. ***Don Gotterbarn,*** *East Tennessee State University, Johnson City, Tennessee.* Over the past decade, the ever increasing role of computer technology in all areas of our life has introduced many new ethical issues. The significant emphasis on the computer's use in illegal or immoral activities as the paradigm of computer ethics is a type of myopia which leads us to miss many of the positive issues of computer ethics. I define computer ethics in closely related ways: 1) when humans make decisions about computers and those decisions change people's lives, then human values are linked to technical issues (computer ethics explores these decisions); 2) any decision made by computing professionals during the design, development, construction, and maintenance of computing artifacts which affect other people. This combined concept of computer ethics is most useful to us when understood as a type of professional ethics similar to medical ethics or legal ethics. When computers were primarily statistical devices printing checks and writing reports, the general populace had little interaction with computers in action. During this age of computing, the definition I offer was not a good definition of computer ethics. Common examples of computer ethical issues in that earlier age had to do with programmers writing programs which perpetrated fraud in banking or stock transactions. As computers slowly and invisibly permeated most areas of our life, we entered a new age of computing in which the successful operation of the computerized processes assumed greater ethical significance. The general public had more interactions with and greater dependence on computerized processes. This change places greater significance on the activity of the computing practitioner. As the practice of computing has changed, so have the computing practitioner's ethical obligations changed in degree and kind. Understanding these obligations and responsibilities should help to enlighten the behaviors and decisions of the average computer user.

ETHICS IN THE BIOLOGICAL AND OTHER SCIENCES. ***William H. Ellis,*** *Austin Peay State University, Clarksville, Tennessee.* This paper is based on many years of experience as a faculty member, administrator, and student. The presentation is about issues related to those experiences as well as a discussion of recent research and findings that may lead to an assessment and reevaluation of teaching styles and expectations. Views of faculty and students are a significant part of the paper. Issues about truth and a more comprehensive discussion about ethics and values are presented. These include acquisition of ethics and value systems, faculty responsibility for teaching ethics and value systems, understanding the broader parameters of ethical behavior, and the importance of attitude in enhancing ethical growth and behavior. Some discussion is included on case studies in ethics and how they can be used to advantage in strengthening the science curriculum. Personal revelations about the importance of a major professor are included as well. Major conclusions include: discussions about ethics and value systems should be included at every level of teaching and research in the university; the most important source for acquisition of ethical and value systems is from advisors, major professors, or other persons who serve as role models; and some researchers tend to work toward minimums rather than toward maximums in ethical behavior (e.g., "this research is not funded by NIH, do I have to follow the rules concerning ethics?").

Papers (nonrefereed) resulting from these presentations are published on pp. 51-63 of this volume and issue, 70(2), of the *Journal of the Tennessee Academy of Science.*