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Harald M. Ness
University of Wisconsin, Fond du Lac

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Harald M. Ness
University of Wisconsin Center
Fond du Lac, Wisconsin

After a great deal of success with their mathematics program for liberal arts students, *For All Practical Purposes*, COMAP has now embarked on a very ambitious project, with financial support from the National Science Foundation, to develop a new one year introductory mathematics course for majors in mathematics and mathematics intense fields. A draft of the two volume text, *Principles and Practice of Mathematics (Math 101-102)*, has been written, and COMAP has an agreement with Springer-Verlag for publication. The project is under the direction of the very capable and indefatigable Walter Meyer. The project can take pride in a very impressive list of authors and advisors: Andrew Gleason, Joe Malkevitch, David Moore, Henry Pollak, Alan Tucker, Joe Gallian, Frank Giardano, and Mike Olinick, to name a few.

I had the pleasure and privilege of attending a summer workshop on the project held at the West Point Military Academy where some of the authors presented topics and background material and interacted with the participants. In studying the materials and attending the workshop, I became aware that there is much in this program and its philosophy that is consistent with the philosophies expressed at the sundry meetings of the Humanistic Mathematics Network, and in articles and essays in the Network Journal, as well as the book published by MAA. I would like to relay my impressions of this important and innovative program.

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There are certain basic premises upon which the development of this program has been based. One major premise is that the prevailing narrow linear path through algebra, trigonometry, three semesters of calculus, and differential equations that has comprised precollege and the first two years of college mathematics for so long is no longer applicable, is counterproductive as far as motivating good students to continue in mathematics and mathematics related fields, and is inconsistent with the current culture.

The current curriculum dates back to when the only significant uses for mathematics were in engineering and physics and gives the impression that in mathematics, time has stood still since the eighteenth century. Mathematics has exploded in many different directions; the current curriculum, through the sophomore college year, does not give the students the flavor of this diversity. It gives them no knowledge of the large variety of modern applications of mathematics.

Rather than the metaphor of mathematics education as a pipeline, Sheldon Gordon, in his position paper on the project, refers to the current preparation for calculus-calculus curriculum viewed by the students as a tunnel, "... a long, dark, subterranean tunnel that they slowly crawl along, constantly scraping their knees, as they pass through poorly seen chambers of algebra, geometry, trigonometry, precalculus, calculus I,II, and III, and differential equations." If they survive the rats waiting to devour them along the way (my metaphor), they exit the tunnel with no knowledge of the diversity of modern mathematics or the variety of applications and, for most, little motivation to continue in mathematics and mathematics related fields. I'm sure that after exiting the tunnel, the shock of the bright light of further mathematics and other math related courses is considerable.

Many people, including C.P. Snow, Morris Kline, Jacob Bronowski, and others have been concerned with the isolation of mathematics from the rest of the culture. We in mathematics, to a large extent,

are responsible for this sad state of affairs. Our aloofness is reflected in our curriculum as described above, the way we teach mathematics, the way we relate to people outside of mathematics, and the way we write. A course in tune with contemporary culture showing the variety of aspects, including operations research, statistics, computer programming, business management, and most scientific and engineering professions would bring us back into the mainstream of the culture. Even after fourteen years of mathematics, our students have had no exposure to the contributions of mathematics to the technology of CAT scans, image processing, compact discs, fax machines computers, and the list goes on. The 1990 report, *Mathematics Outside of Mathematics Departments* by Sol Garfunkel and Gail Young shows that more students are enrolled in advanced mathematics courses taught outside of mathematics

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departments than are enrolled in courses taught within mathematics departments. This is further evidence that we are not providing the mathematics needed in the rest of the culture, but rather are isolating ourselves by continuing to teach from a very narrow viewpoint.

Another basic premise of the project is that students should become, early on, familiar with the diversity of modern mathematics. Hence, rather than the very intense depth of a small number of phenomena of the current curriculum, this program stresses breadth. The introductory college courses in other disciplines are of a survey nature, elucidating the various branches of the disciplines. It is believed that doing a similar thing in the introductory mathematics course would whet the appetite of students for further study of mathematics and mathematics related fields.

Immediate applicability of the mathematics to contemporary cultural needs is another premise upon which this project rests. To me, there is a clear departure in this program from the focus on the development of mathematics for mathematics sake to a focus on the culture and the place of mathematics in this culture as well as the contributions of mathematics to the rest of the culture and vice versa. Cultural stress (Ray Wilder's term) is responsible for the development of most of mathematics. This course clarifies that role.

Principles and Practice of Mathematics (the name may change) attempts to weave together a study of change which includes a prelude to the fundamental methods of calculus in a discrete setting, geometry with emphasis on vectors laying a foundation for linear algebra and calculus, linear algebra which is fundamental and permeates mathematics and its applications, discrete topics of graph theory and algorithms with an emphasis towards computer science, algebraic (and geometric) structure, and probability. Although an excellent job of considerable weaving takes place—certainly far more than current curricula—it is not as much as we idealists would prefer.

Is this, then, the ideal introductory college mathematics curriculum? Of course not; there is and cannot be one. Curriculum should be a dynamic endeavor, not a static structure. However, this is a start, and I believe an excellent start, on developing a more meaningful curriculum. I encourage all to peruse this fine initial attempt; a cursory glance will not do it justice.

I have advocated, for years, a core curriculum for the first two years of college mathematics. Both Sheldon Gordon and Joe Malkevitch, in their position papers, spoke to the desirability of removing the artificial barriers that separate various "branches" of mathematics. These barriers constitute a deterrent to effective and efficient mathematics education. These so called branches of mathematics are all intertwined. They sustain each other. They are one. Why can't we teach mathematics that way?

There is a great deal of resistance to change, especially in the college mathematics community. Remember the old cigarette commercial, "I'd rather fight than switch"? On a take off from that, Sol Garfunkel, in a recent editorial in *Consortium*, stated, "I'd rather work than fight". I'm with Sol.