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A Multidisciplinary Approach to Mathematics

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(Extracts from the keynote address to be delivered at the 108th Annual Meeting of the International Federation of Mathematical Societies (IFMS) at Loempia, Angora, Monday 11 - Friday 15 October 1976.)

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Ladies and Gentlemen,

Now and again the great public is taken by surprise by the announcement of some startling discovery, some exciting invention or scientific breakthrough, and they cannot but get the impression that such things happen suddenly, even the scientists themselves being utterly unprepared for it. But the student of the history of science knows differently: even if he cannot smooth the discontinuity completely, he knows that in all cases such a breakthrough is the natural consequence of a usually long preparation --be it hidden for the casual observer-- like the development of a carbuncle, deep under the skin.

The same holds for the current breakthrough in the practice of Mathematics, for which, as I hope to show, the seeds have been sown during the last three decades. For,this time the breakthrough did not only surprise the outsiders, it surprised many mathematical insiders as well, the reason being that the first seeds were sown and took root outside the Mathematical world itself.

We all still carry with us the cherished and endearing image of the Mathematician as it has come to us through the ages: half genius, half nitwit, partly deep thinker and partly just juggler with symbols, a man so absorbed by his own artificial world that he hardly belongs to the real one. Are not Archimedes' words to the Roman soldier: "Don't disturb my circles!" the archetypical ones? And when the Roman soldier did as is usually done with someone who is not understood, and killed Archimedes with a single thrust of his glorious sword, we all feel that sword piercing our own romantic hearts....

The image may have been a true one, but World War II has changed the world: it caused a collision not only between nations, but between sciences and between different walks of life as well. The intercommunication has broken the isolation, the lonely scientist burning the midnight oil has been replaced by the scientific worker keeping normal office hours, the romantic thinker believing in truth for truth's sake has been replaced by the businesslike and efficient solver of problems of social, economic and technical relevance.

As Chairman of the Board of "Mathematics Inc." --now the world's leading mathematical industry with a firm grip on more than 75 percent of the world market-- I am in a better position than anyone else to give you all the inside information about the refreshing breeze that has blown new life into the mathematical science, at a moment that it was getting stale and in danger of dying of old age.

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The decision to give the mathematical industry, for the first time in history, a solid foundation based on market research has, of all the changes, probably had the most profound effect. For instance, one of the most successful discoveries of our sales department was directly related to a significant trend in today's civilization, viz. the use of square tiles instead of wall-to-wall carpeting. The result was a revolutionary re-edition of the old-fashioned multiplication tables, but now, in order to ease the estimation of the number of tiles needed, in the form of a two-colour halftone division table.Its title alone: "Tiles for Everyone." is, all by itself, a masterpiece of mathematical popularization. (Our original title "Tile estimations made understandable for the layman." was completely demolished by our sales department as being too condescending; so was our next effort "Tile estimations made easy.".) In a sense, it was only a minor product, but in another sense it was the beginning of a mathematical revolution: as for years this table has been responsible for over 20 percent of our revenue, it has taught us all, that in the past, mathematicians, guided by their intuition instead of by scientific market research, have tackled the wrong problems.

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Another discovery, perhaps surprising for the older ones among you, is that there is absolutely no market for the so-called "eternal truths" previous generations of mathematicians have been after. But we have understood that in the world of fast progress we are living in now, the only important results are those with a halflife of at most five years. As in the traditional mathematical papers the delay between submission of a paper and its eventual publication is of the same order of magnitude, we had to bypass the established channels, but as the lack of referees with social responsibility forced us to do so anyhow, this posed no additional problem.

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We have also found out that, as important as what you publish, is how you publish it. A small example: when it was made a company regulation to replace "etc." --as most readers are not quite sure of which obsolete Latin expression this is an abbreviation-- by the more homely "and so on", sales immediately jumped by more than 15 percent! That shows what public relations can do for mathematics!

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The mathematical establishment works on paper that is higher than wide. Our ergonomics department did a work analysis and discovered that the hand's horizontal mobility exceeds its vertical mobility by a factor of 1.4 and, as a result, it became a company rule to turn the normal office paper over 90 degrees. The results were startling. At first, Productivity Control was very disappointed, because, after the change, productivity measured --as they were used to-- in lines of mathematics produced per manday seemed to have decreased slightly. Measured in number of symbols written down per manday, however, the increase was significant! Measured in number of pages of mathematics produced per manday the improvement was still more striking! Needless to say, the discovery of that last productivity unit must be considered as one the greatest recent contributions to the gross national product in all countries where we are represented. (White, oval office paper has been tried, but the experiment has been abandoned: it led to too many circular arguments.)

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As a company with the avowed aims of not enriching itself at the expense of others, but to work for the benefit of our total civilization, a thorough study has been made of the thresholds that, traditionally, restrict the benefits of bourgois mathematics to an elite minority. As a socially responsible organization, and also from market considerations, we felt it, already early in the company's history, as one of our primary duties to try to bring Mathematics to the Millions. The major stumbling block turned out to be the abundant use of Greek and Hebrew characters and other fancy symbolisms, which, since then, have been rigourously abolished. (The re-education of our mathematical staff, implied by this abolishment, I am sorry to say, has not been without problems, because, although apparently converted, many staff members tended to persist in their bad habits in secret. A number of strong measures, based on undeniable evidence of guilt from the staff member's wastepaper baskets, has implemented the ultimate solution to the Greek-and-Hebrew-letter problem.) As new educational experts --so-called "enlightening specialists"-- have been attracted, we are confident that future re-orientations of our technical staff will be implemented so smoothly as to remain totally unnoticed by them.

We have taken this measure, as new re-orientations are only to be expected: a current experiment to restrict, for instance, the use of the alphabet to that of capital letters only, is underway and looks very promising. In retrospect, it is no surprise that, in spite of a tradition of 2500 years, Mathematics has no more achieved than the little it has: all through those 25 ages, a thorough scientific study of the Man-Paper Interface has never been made!

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Compressed into a single sentence my message is that the Interdisciplinary Approach to Mathematics will lead to a better world. The chains of inhuman formalism being broken, intellectual slavery will become intellectual freedom, "the happy few" will become "the happy many"! *)

And finally, for Mathematics in general, and for Mathematics Inc. in particular --what, after all, is the difference?-- I can only end with the deeply felt prayer: "Semper floreat et crescat."!

*) For those interested in further details, we refer to "A Guide to Positive Problem-Solving" to be published shortly by the Hosanna Press.

11th August 1974