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Speech at the Occasion of an Anniversary.

by Edsger W.Dijkstra

Ladies and Gentlemen!

It is my pleasure and privilege, as Chairman of the Board of "Mathematics Inc.", to address you, its shareholders, at the 10th Anniversary of our Company. At this occasion it seems befitting to give you a short survey of its illustrious history.

All of you, of course, know how the company was founded, when three young, eager and enterprising mathematicians left their common employer, dissatisfied as they were with its purely commercial objectives and also convinced that, on their own, they could make much more money. And right they were!

We are all here as witnesses of the fact that it was not the inside information they took with them, but the vigor of the fresh young organization they founded, based on professional competence only, that made the enterprise the financial and scientific success their initiative deserved. Their native abilities were, of course, supported by a keen insight in the problems and possibilities of their former employer's market, but it clearly needed people of their keen intellectual perception to see that the old four-colour problem --almost forgotten to be a problem!-- could serve as the basis and starting point of a business as successful as ours.

Up till that moment all cartographers had always thought that they would never need more than four different colours on their maps. Similarly, eye tests for colour sensitivity of pilots and ship captains had never required the ability to distinguish between more than four different colours. It was in this sensitive area of map making and traffic by air and sea that these three gentlemen pointed out that up to that moment the sufficiency of the number "four" was no more than a mere assumption that could be killed by the first counter-example.

In view of the reorganizations that would be needed when a fifth colour would be discovered to be necessary, a great nervousness was aroused and at that moment the young company saw the possibility of one, or possibly two contracts in connection with the four-colour problem. A quick but thorough piece of market research was launched in order to discover where the greatest opportunities would lie: would it be in the proof that four colours would always suffice or would it be in the proof that occasionally five (or perhaps even six!) would be needed? For the first product they had the support of the Map Makers Association and of the International Union of Airline Pilots, for the second product the support of printing ink manufacturers and some small shipping companies that would like to use the result as a means of getting rid of a few of their older captains. The critical question, of course, was which of the two products would be preferred by the Navy and the Air Force. As luck would have it, the needs of the latter two pointed into the same direction and within two months, based on solid contracts with both the military and the civilian, our Company was founded.

In its earliest time it was beset by all problems of a young and growing company: moving from modest dwellings to more sumptuous quarters, readjusting the planning, the budget etc. and, as was to be expected, after

the almost canonical period of nine months, serious disagreement between the three founders caused one of them to leave the Company and to start all by himself. His parting --I am happy to say-- did not create any ill-feelings: he still owns a part of the company's stock and occasionally he acts as independent consultant. The disagreement was on planning.

The remaining two directors felt that a first working version of the Proof could be delivered at 27 months after the contract had been signed and this planning was not reconsidered until the 12th month. At that critical stage it became apparent that the project had suffered from two misfortunes. Upon closer scrutiny one of the smaller Proof Modules had presented difficulties that, with the then present state of the art, proved to be unsurmountable. For a few weeks the company hesitated between two different courses of action, either to redesign the interfaces between the Proof Modules such as to make each of them more manageable, or to launch a research effort that would yield the technology enabling us to deal with the obstinate, unruly Module. As some of you will remember, this was the Company's most critical moment, not in the least because either course of action was preferred by one of the two remaining directors.

Within a few weeks, however, one of them managed to get the Navy's support for his approach, as a result of which the other director got the Air Force's support the next day. Of course this meant doubling the Company's size, a move to new quarters and all that: the Company's two Divisions, I am happy to say, work together in full harmony and the Board was very happy to see the broadening in scope: a one-product company is always somewhat vulnerable.

A second misfortune --that really could not have been foreseen and for which we cannot blame our Company-- was that two Universities failed to fulfil their obligations: in January they had accepted the obligation to produce at the end of the academic year a given number of brilliant mathematicians. At the end of term time the two Universities, however, de-committed themselves in the most shameful manner; as there was no written contract we could not sue them. But this is typically what happens to young companies only: we have learned our lesson and since the second year of our existence our contracts with Universities as regards the delivery of brilliant mathematicians protect our interests so well that, as a matter of fact, we often prefer to recover the damages.

We had to redo our PERT-planning and we had a hard time explaining to our clients that the first delivery of a Proof had been re-scheduled at month 35 instead of 27, but we succeeded. A next critical moment occurred when that second deadline was approaching. In the mean time, however, we were more firmly established. Firstly we could point to the fact that we had over 200 mathematicians working on the project, secondly we had been able to reshape the decommitment of the two Universities into an advantage: as they felt somewhat guilty, pressure could be exerted to make them our first two so-called "Institutional Members" of our organization. As the two Universities in question were both very influential and also anxious to share the responsibility, we had 12 Institutional Members --7 of which were well-known-- by the time that the 35-month deadline approached.

As a result it was not too difficult to appoint a fully independent Supervisory Board that was willing to assert that the 35-month deadline --the result of youthful optimism and all that-- had to be postponed: at the modest price of a few megabucks we bought the officially approved postponement until month 48.

When that deadline approached we indeed delivered the first release of the Proof. Admittedly it contained still a number of bugs, but the Company in the mean time had grown up to 350 mathematicians and was fully confident that, with the aid of the trouble reports coming from the field, it would get the Proof basically straightened out within the next four releases, a confidence that, as you all know, turned out to be fully justified.

The Proof of the four-colour conjecture turned out to be a most successful product of the Company. After our first customers had reported that, on the whole, they could live with it, general confidence grew and at month 75, shortly after our third release, the number of customers had grown with a factor of three. The more extensive field testing leading to more experience and trouble reports was met by a healthy growth of the Company which at the age of six years had grown to 720 brilliant mathematicians.

Although the Proof was not yet fully completed, it became obvious that with new products we had to open new markets. It was not quite obvious which. The progress with the four-colour problem eventually had been so rapid that the accompanying decrease of its personnel budget came somewhat as a surprise to our young management that had had no earlier experience with projects in the stage of successful completion. Again we had a hectic period: should we fire the surplus mathematicians with the risk of not having them at our disposal when we would need them for our next project?

In the mean time the government was so heavily committed that a few of its organizations and persons, who first had been our foes, could be turned into our friends at a price modest compared to what our Company gained in terms of continuity and stability. It was observed that for Pythagoras' Theorem at least 100 different proofs were hanging around, and practically all incompatible with each other! We managed to lend 150 mathematicians on a temporary basis to the appropriate Standardizing Body to sort out that mess and decide upon a Standard Proof for Pythagoras' Theorem. And as you all know, a few of our Institutional Members have been most successful in rejecting with their Academic Authority all constructive proposals for a Standard, thereby prolonging the proceedings until, within the Company, a new project would be well on its way. What did I say, a new project? No! Two projects even!

The Company hesitated between Fermat's Last Theorem, Goldbach's Conjecture and Riemann's Hypothesis. After careful market research Fermat and Goldbach --having more appeal to the man in the street-- proved to be more promising than Riemann at this stage. As they seemed equally profitable, both were selected.

Now we have our 10th Anniversary: the four-colour problem has been nearly solved, for Goldbach's Conjecture and Fermat's Last Theorem we have solid contracts and the size of our Company has grown to nearly a thousand! You, shareholders, are of course mostly interested in the Company's growth potential. To you I can only describe it as "magnificent"! Know your shares supported by the loyal devotion of one thousand brilliant mathematicians, by a Company that, by its earlier successes, has established itself firmly in the market place. We have often been copied, but never been equalled! "Semper floreat et crescat Mathematics Inc!"

(Applause.)

16th June 1974