Chapter 5

Dutch Mathematicians and Mathematics Education—A Problematic Relationship

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Abstract Mathematics as a compulsory school subject was introduced in the Netherlands in the first decades of the 19th century. While in the beginning there was some involvement of Dutch academic mathematicians, later on their engagement with mathematics teaching was only marginal. That changed in the second half of the 20th century. Hans Freudenthal, professor of mathematics in Utrecht, became deeply involved in mathematics teaching. He became the first director of the IOWO, the Institute for the Development of Mathematics Education, that dominated Dutch mathematics teaching from the 1970s on. In the 1960s, under the influence of New Math, other mathematicians had already played a role in the modernisation of the teaching of mathematics, but from the 1970s on, their role became minimal again. In the first decade of the 21st century the dominance of the ideas of Realistic Mathematics Education elicited protests from mathematics departments at several universities. This criticism induced fierce and often heated debates. At the moment, these discussions have calmed down and it seems that a new understanding between the worlds of school and university mathematics is growing.

5.1 Start of a Tradition of Academic Involvement in Mathematics Teaching?

In September 1826, D. J. van Ewijck, one of the highest-ranking government officials of the Ministry of the Interior and in charge of educational affairs, wrote a letter to all Latin schools¹ about the teaching of mathematics. In this letter, he explicitly recommended the use of the textbooks of J. de Gelder, professor of mathematics at the University of Leiden. De Gelder, a former schoolteacher and now a prominent

¹Latin schools were grammar schools for boys of approximately 12–18 years old to prepare them for university.

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mathematician, wrote books on arithmetic, algebra and plane geometry, especially destined for use in Latin schools (Smid, 1997).

By advising these books, the Dutch government sailed an intermediate course between Prussia and France. In Prussia, the mathematics teachers in the gymnasia (grammar schools) enjoyed complete freedom in the choice of their textbooks, in France, the government strictly controlled which books were used. In Prussia not seldom the teacher did write his own textbook, or did not use one at all, while in France the government stimulated, or even required the use of textbooks written by eminent mathematicians.

The letter of Van Ewijck, and the books of De Gelder, who did not only write textbooks, but was involved in many ways in the teaching of mathematics, might well have been the start of a tradition of academic involvement in mathematics teaching. To call such a tradition into existence, two conditions had to be fulfilled. The government should stimulate and facilitate an active role for mathematics experts in secondary education. These experts themselves had to be interested in fulfilling such a role, and be willing to spend time on it. In the persons of Van Ewijck and De Gelder, these requirements were met.

5.2 Aloofness of the Government

But the actions of Van Ewijck and De Gelder were not followed by further steps. On the contrary, the growing political influence of liberally orientated politicians, such as J. R. Thorbecke, who wanted government interference with internal school affairs to be as minimal as possible, made these impossible. The laws of 1863, in which the HBS,² the Dutch variant of the German '*Realschule*' was created, and of 1876, which did the same for the modernised gymnasia, gave only a short outline of the content of the required mathematics curriculum (Krüger, 2014). Schools and teachers were left a great amount of freedom to organise their teaching.

The main advisor for the law of 1863 was D. J. Steyn Parvé, a government official who had been a mathematics teacher at the gymnasium in Maastricht. Steyn Parvé was a competent mathematician, but not a productive researcher and had not had an academic career. Soon after the introduction of the law, he was appointed as one of three *inspectors* for the HBS. The corps of inspectors, three³ for the HBS, one of whom was always a mathematician, and one for the gymnasia, constituted the intermediary between the government and the schools. They were usually former teachers, who had made a career as headmaster of a HBS or rector of a gymnasium. They were not chosen for their scientific reputation, but for their experience in education. Some inspectors, like Steyn Parvé or, later, E. Jensema, became quite

²Hogere burgerschool; the former Dutch general secondary school for 12- to 17-year-olds intended as a practically oriented education for higher functions in industry and trade.

³At the start of the HBS three inspectors were appointed, but the number varied over the years.

influential in the field of mathematics teaching, and the government usually followed their advice.

Towards the end of the 19th century, the political discussions about religious schools and their financing, the so-called '*school war*', forced the government to even greater restraint in internal school affairs. After the compromise that was reached in 1917 ended the conflict. A reserved attitude towards internal school affairs remained the ultimate wisdom. Until the 1960s the Dutch government did not want to play a prominent role in schools. "*No state pedagogics*", was its credo.

5.3 No Role for the Experts

If the experts wanted to play a role of any importance in secondary education or exert serious influence on it, they would have had to achieve this on their own strength, without government support. That would not have been easy.

For example, changes in the curriculum were usually discussed by teacher unions, or special committees of teachers, and then had to pass the corps of inspectors before the government took any decision. University professors did not have any formal role in this process. They played some part in the final school examinations, through taking part in oral examinations and controlling the grading of written assignments. But these written assignments were devised by a select group of teachers and determined by the inspectors, the experts had no say in this. Nor did they have any involvement with the textbooks. The government left the production of textbooks to the market; textbooks were written by teachers and teachers were free to choose those books they liked most.

If the group of university experts had shared some common ideals and goals about mathematics teaching, and if they had combined their efforts, they might still have gained some influence. But then they should have been willing to spend time and energy on a more than incidental basis on questions and problems concerning mathematics education.

That was not the case. Involvement by professional mathematicians in mathematics teaching for secondary schools remained incidental and the concern of isolated individuals. The development of the Wiskundig Genootschap (Mathematical Society) is an example of this. Originally founded in 1779 as a society for mathematics practitioners and schoolteachers, in the 19th century it became a society for research mathematicians, and school teachers hardly played a role anymore. The society never formulated any advice or proposal concerning mathematics education.

An example of an expert who at least was interested in teaching and education was D. Bierens de Haan, professor in mathematics in Leiden in the second half of the 19th century, with a good international reputation. He had been a mathematics teacher in Deventer, and was an elementary school inspector alongside his professorship, he wrote some mathematics textbooks (including an adaptation and translation of Lacroix's *Elements de Geometrie*) and played a minor role as an advisor

of Thorbecke concerning the law of 1863. He collected an impressive collection of books concerning (mathematics) education, which is now in the University Library of Leiden. Even so, one cannot say that he had any important or lasting influence on secondary mathematics teaching.

There were more mathematicians who were interested in teaching, like G. Mannoury and D. van Dantzig. Mannoury was a professor in Amsterdam, Van Dantzig was one of Mannoury's students and after World War II also a professor in Amsterdam. In the late 1920s they wrote some articles about mathematics teaching, but the ideas of Mannoury and Van Dantzig differed so much from the mainstream ideas in those days, that already for that reason alone they had hardly any influence (Smid, 2000). They criticised the general formative value of mathematics and transfer to other subjects. Another example of a professional mathematician who was interested in mathematics teaching was F. Schuh, professor in Delft and Groningen. Not only did he publish many articles about mathematics especially for teachers, but he even wrote a book on the didactics and methodology of mathematics (Schuh, 1940). Schuh did not propagate modern mathematics to the community of mathematics teachers but restricted himself to then already outdated 19th century topics. His book on didactics and methodology is not written for secondary education, but for junior students in the sciences and technology and their lecturers. It is mainly a collection of tips and tricks, for example, how to use a textbook or solve certain types of mathematics problems or about the best way to pass an exam. There were more professors in Delft who were interested in mathematics teaching, but as a rule they were even more conservative. *Euclides*, the magazine for mathematics teachers, founded in the early 1920s, regularly published articles by mathematics professors, for example, their inaugural addresses (with a photo of the new professor), but these seldom had to do with the teaching of school mathematics.

A far more interesting person was Tatiana Ehrenfest-Afanassjewa, born in Kiev in Ukraine. She was a physicist in the first place, but had also studied mathematics in Göttingen with Klein and Hilbert. She had no official position at a university, but being the wife of Paul Ehrenfest, the successor of Lorentz, in 1912 she came to live in Leiden. She wrote some interesting articles on mathematics teaching, published her now famous *Übungensammlung* (Ehrenfest-Afanassjewa, 1931), and organised a discussion group about mathematics teaching (De Moor, 1999). Before World War II, this group consisted mainly of outsiders and had little influence, but that changed after the war.

Things might have been different if the only Dutch mathematician of great international reputation, L. E. J. Brouwer, had been interested in teaching. But Brouwer had no interest at all. In the Netherlands, there simply was no Felix Klein, Émile Borel or Guido Castelnuovo.

So, for a long time Dutch mathematics teaching received little influence or impulse from the scientific community. To a large extent, mathematics teachers could settle their own affairs, not only at the HBS and gymnasium level, but even more so at the numerous MULO⁴ schools.

⁴(Meer) Uitgebreid Lager Onderwijs ((Further) Extended Primary Education).

5.4 A Stagnating World

In a way, the system could be called democratic: teachers could have their say concerning changes, and developments and drastic interventions from outside did not occur. But there was a price to be paid for this. After the attempts to renew Dutch mathematics teaching in the 19th century, a long period of conservatism and stagnation followed. The world of Dutch mathematics teaching was trapped in isolation. For instance, the first international reform movement, initiated by Felix Klein, had hardly any influence in the Netherlands (Smid, 2012). In the Commission Internationale de l'Enseignement Mathématique (CIEM), the forerunner of the International Commission on Mathematical Instruction (ICMI), Dutch mathematicians played no role of significance. The most prominent schoolbook author of the first half of the 20th century, and founder of several journals for teachers, P. Wijdenes, claimed that he never consulted a foreign secondary school textbook.

Of course, there were some reform attempts, mainly to include calculus into the curriculum. The attempt that at least had a partial result was the one led in the 1920s by E. J. Dijksterhuis, who later became famous as a historian of science. He was progressive concerning the teaching of calculus, but an outspoken conservative on the teaching of geometry. As a historian, Dijksterhuis, who later became professor in the history of science in Utrecht, but who was an HBS teacher at that time, had ample international contacts, but hardly any concerning mathematics teaching. He was aware of the publications of Klein, and at a conference in Groningen in 1925 he had a public discussion with Walter Lietzmann, rejecting all his ideas about modernising mathematics teaching, but there are no indications that he was really interested in modern developments in teaching abroad. Dijksterhuis' attempts on the introduction of calculus received hardly any support from the academic community. They were even opposed by some academic groups, such as the mathematics professors at the Technical University in Delft, who preferred to keep the HBS as it was in the 19th century.

On the whole, the result was stagnation (Van Berkel, 1996). Around 1955, the world of Dutch mathematics teaching had a surprising resemblance to that of 1875. Change would come in the 1960s, under pressure from the government, and led by experts from outside.

5.5 The Times They Are A-Changin'

In the 1950s, the pressure on changing the *status quo* was slowly building up. First of all, the modernising society created new jobs and roles for mathematicians, and more generally, for experts in the sciences. Statistics became more important, not only in mathematics and the natural sciences, but also in the social sciences. The idea that the teaching of mathematics was only important for most students as '*gymnastics for the mind*' became untenable. Mathematics and good mathematics education became an

economic necessity. The idea of *transfer*, that is, the idea that learning mathematics would automatically make you a better thinker, was more and more criticised. On top of that, within the academic community of mathematicians there was a growing concern about the gap between what was essentially 19th century school mathematics and modern, 20th century mathematics. These were not national, but international trends, but unlike in the years before World War II, the Netherlands could no longer afford an isolated position.

A sign of the growing concern and interest for mathematics education within the community of mathematics experts was that in 1954, the Wiskundig Genootschap founded the Nederlandse Onderwijs Commissie Wiskunde (Dutch Committee for Mathematics Education), a committee in which professional mathematicians and mathematics teachers cooperated. The committee, soon chaired by Hans Freudenthal, operated also as a subgroup of ICMI.

Individual experts also showed their interest. One of them was Van Dantzig, mentioned before as a student of Mannoury. In some articles, he had published around 1930 as a young man he had argued that the way mathematics was taught was quite useless for most students. He had not obtained any hearing, and he remained silent on this subject for over twenty years. He was now professor of mathematics in Amsterdam, had specialised in statistics and was deeply involved in consulting activities for industry and society. In 1955 Van Dantzig wrote a report for ICMI, *The Function of Mathematics in Modern Society and Its Consequences for the Teaching of Mathematics* (Van Dantzig, 1955). A translation was also published in *Euclides*, the Dutch magazine for mathematics teachers. It did not have immediate effects, but it certainly had influence on the long term.

There are more examples of mathematics professors who wrote articles on mathematics teaching in the same spirit. For instance, in 1958, J. C. H. Gerretsen, professor of mathematics in Groningen, wrote an article in *Euclides* about the goals of mathematics education. The article was written on the occasion of the new curriculum of 1958, and it stressed the need of the modernisation of mathematics teaching on account of the now crucial role played by mathematics in modern industrial society. The article ends with the prophetic words that the new curriculum could be seen as a deserving step forwards, but that it should not be seen as a definitive curriculum, not even as a programme for the long term (Gerretsen, 1958).

Not all mathematicians shared this view about the role of mathematics in society. The logician E. W. Beth, known for his cooperation with Jean Piaget (see Piaget et al., 1955), maintained the point of view that the introduction of axiomatic reasoning was the ultimate purpose of mathematical instruction, but he was an exception.

The involvement of most mathematicians like Van Dantzig and others in those years can be characterised in two ways: (1) it had as a starting point their concern about the *content* of school mathematics, and (2) it had an incidental character and did not lead to a *permanent* involvement of the authors in the affairs of mathematics education.

Neither of these two characteristics can be applied to the activities in mathematics education of another mathematician: Hans Freudenthal. He became seriously interested in the didactics of mathematics during World War II, and after that he soon

joined the Wiskunde Werkgroep (Mathematics Working Group), a continuation of the discussion group led by Tatiana Ehrenfest-Afanassjewa and now rapidly gaining importance as a focal point for all who had the revitalisation of Dutch mathematics teaching as their goal. Within a short time Freudenthal became the chair of the Mathematics Working Group, which was the starting point of a permanent involvement in mathematics education. Of course, Freudenthal was well aware of the outdatedness of Dutch school mathematics. He and his ideas played an important role in the realisation of the new curriculum of 1958, which introduced calculus to the curriculum and examination programmes, and removed descriptive geometry (La Bastide-van Gemert, 2015).

But unlike other mathematicians who were interested in mathematics education, Freudenthal's focus was primarily on good teaching, not on modernising the curriculum. In a letter, written in August 1961, Freudenthal wrote:

I have argued several times, as is well known, that I see the modernisation of the curriculum (...) not as an urgent problem, not because I should dislike modern mathematics, but because of the fact that in several proposals the introduction of modern mathematics is seen as a principal goal. On the contrary, I see as the first and only urgency the improvement of mathematics education. (Wijdeveld, 2002, p. 202) (translated from Dutch by the author)

Within ten years, Freudenthal's point of view would become the dominant one. That would have great consequences for Dutch mathematics teaching.

5.6 The Big Bang

The letter by Freudenthal cited in the previous section was addressed to A. F. Monna, then lecturer, later professor of mathematics at the University of Utrecht. Monna, who also had made a career as a government official at the Ministry of Education, was the secretary of the Commissie Modernisering Leerplan Wiskunde (CMLW; Commission Modernisation Mathematics Curriculum).

That commission was a new development in the world of Dutch mathematics teaching. It was appointed in 1961 by the Dutch government and had as its task to advise the government about the modernisation of the mathematics curriculum. The founding of the commission was a direct consequence of the Royaumont conference. Convinced of the urgency of such a modernisation, the government did not want to wait for initiatives from mathematics teachers themselves, and appointed a commission that consisted of ten professors and a lecturer in mathematics, a teacher educator, two inspectors and only four teachers. Its chairman was H. T. M. Leeman, mathematics professor at the University of Amsterdam, who had attended the Royaumont conference. The other two Dutch delegates, L. N. H. Bunt, a teacher educator and P. G. J. Vredenduin, a mathematics teacher and textbook author, who went to Royaumont were also appointed. Freudenthal was one of the committee's members. As the State Secretary for Education stated, the CMLW had the explicit task to advise the government about

which modern parts of mathematics could, seen from the viewpoint of science, be apt for introduction in schools preparing for university, in view of the reduction of the gap that exists between university and school mathematics”, as the deputy minister of education formulated it in his address on occasion of the installation of the committee. (Euclides, 1962, p. 146)

There were some additional questions, about special programmes for mathematically gifted children, possible experiments in schools concerning the teaching of modern mathematics, and courses to introduce older mathematics teachers to modern mathematics, but the main purpose was fairly straightforward: the modernisation of mathematics curricula in schools preparing for university.

Freudenthal had not attended the Royaumont conference as he did not expect it would be very important. That was a mistake, as he admitted later, and due to his stay in the United States, Freudenthal had also missed the first meeting of the new commission, so in a way he was lagging behind. As soon as he had returned to the Netherlands, he took action, as the letter of August 1961 shows. He made it clear that the main and official task of the commission, the modernisation of the curriculum, was not his first priority. He had exerted considerable influence on the curriculum of 1958, with which he was rather content, and he saw no reason for immediate change. In its first meeting, the commission had mainly discussed possible changes in the examination programmes, but Freudenthal had other priorities. He wanted to start with the lower grades.

In his autobiography, Freudenthal (1987) suggests that the CMLW initially viewed him as an ‘enfant terrible’, and that the subgroup that was created on his request and that should concern itself with the lower grades, was no more than a kind of playground specially created for him. That seems rather unlikely. At that time, Freudenthal was already without a doubt the most outstanding mathematician within the commission, and moreover, he was the only one who had already been deeply involved in the didactics of mathematics, both nationally and internationally, for more than fifteen years. He soon succeeded in bending the commission to his will.

In the first years, most of the commission’s work focused on two aspects: developing courses for teachers to make them acquainted with modern mathematics, and carrying out teaching experiments, including one for the lower grades on transformational geometry and one for the higher grades on calculus. The courses for teachers, that attracted a large number of participants, were in line with the terms of reference of the commission, the teaching experiments in fact much less so.

The work of the CMLW was complicated by a development that had nothing to do with the teaching of mathematics itself. Finally, in the 1960s the government was successful in replacing the patchwork of 19th century laws on education with one comprehensive law, creating a complete new school system, with new school types. The Ministry of Education asked the commission to devise curricula for all new school types, a much larger task than foreseen at the start. After some years, even mathematics for elementary schools became a topic of study for the commission. In the end, the commission was able to present a complete set of curricula for all new school types.

To do all this work, the CMLW appointed a substantial group of co-operators, mainly former mathematics teachers. In the early 1970s, this group formed the core

of the newly-founded IOWO,⁵ now Freudenthal Institute (FI). Freudenthal became its first director.

Halfway through the 1960s, Wimecos,⁶ one of the two then existing mathematics teachers' associations, tried to devise a program for one of the new school types on its own, but its effort was soon over taken by the commission (Wijdeveld, Verhage, & Schoemaker, 2000). In the 1970s, the union tried again to gain influence on curriculum formulation by setting up a didactical working group for that purpose, but to no avail. Constructing curricula was definitively out of the hands of teachers and in the hands of the experts.

For most of the mathematics professors, the work in the CMLW must have been a bewildering experience. They were mathematicians in the first place, with some interest in mathematics teaching. They were asked to advise the government in their spare time about the modernisation of the mathematics curriculum of schools preparing for the university, which seemed a pretty simple and straightforward task. But their commission ended in a complete institute with more than a dozen of full-time collaborators, all of them with a primarily didactical orientation, performing tasks with which most of these mathematics professors had hardly any affinity. What was their role? Apart from Freudenthal and Van der Blij, a younger colleague of Freudenthal who shared many of his ideas and who soon succeeded Leeman as chair of the CMLW, did they still have any influence?

The archives of the CMLW have been lost, so it is impossible to reconstruct the complete history of the commission.⁷ But one conclusion can be drawn. When the committee started its work, it seemed as if the experts, mainly the mathematics professors, had at last obtained considerable influence in the world of mathematics teaching, at the expense of the traditional organisation of teachers of mathematics.

Then, years later, the picture was completely different. The community of professional mathematicians had again disappeared from the educational scene, and would not return there for decades. The mathematics teachers' unions had indeed lost a great deal of their influence which was now in the hand of another group of experts: full-time didacticians, first only within the IOWO and its successors OW & OC⁸ and FI, later also in SLO (Netherlands Institute for Curriculum Development). Of course, the first two directors of the IOWO, Freudenthal and Van der Blij, were excellent mathematicians, but in their role as IOWO directors they acted much more as didacticians than as representatives of the group of mathematics experts. Their successors, J. de Lange and J. van Maanen, had made their career in teaching, not in mathematics research. Didactical experience and expertise had become much more important than mathematical brilliance.

⁵Instituut voor de Ontwikkeling van het Wiskunde Onderwijs (Institute for the Development of Mathematics Education).

⁶Vereeniging van Leeraren in de Wiskunde, de Mechanica en de Cosmographie aan Hoogere Burgerscholen en Lycea (Association of teachers of mathematics, mechanics, and cosmography).

⁷The archives of the CMLW are recently rediscovered in the Central Archives of the Ministry of Education in The Hague.

⁸Onderzoek Wiskundeonderwijs en Onderwijs Computercentrum (Mathematics Education Research and Educational Computer Centre).

5.7 Return of the Mathematicians

Freudenthal and his institute dominated the Dutch world of mathematics education from the 1970s on. In the 1980s, most of the examination programmes in secondary school had been reformed and contained at least some elements in the spirit of Realistic Mathematics Education, and in the 1990s the same happened with the programmes of the lower grades in secondary education and the textbooks in primary education. All these and other changes to the programmes were of course the cause of some discussion, but on the whole, the world of primary and secondary education agreed with the way things were going.

Professional mathematicians and their organisations seemed hardly interested. Typically, at most universities, teacher education was removed from the mathematics departments and centralised under the authority of general educationalists. The mathematics departments did not protest. Educating a mathematics teacher was not what they were interested in.

That changed in the first decade of the 21st century. Universities, especially the universities of technology, started to complain about the lack of algebraic skills of their first-year mathematics, science and technology students. According to these departments, their students were not able to handle the simplest techniques. They blamed the new programmes and criticised the extensive use of (graphic) calculators in mathematics teaching in secondary schools. Universities started to organise entrance tests for their first-year students, and offered courses to repair their shortcomings, sometimes even obliging their students to follow these courses if they had failed to pass the tests. Surprisingly, the students joined in with the complaints of their lecturers and exerted pressure to the Ministry of Education to put more emphasis on the teaching of algebraic skills in school.

Another point of criticism concentrated on the teaching of arithmetic in primary schools. According to the critics, national and international evaluations showed that the performance of Dutch children was deteriorating, and the critics blamed the influence of Freudenthal and his school for that.

The main initiator of all this criticism was J. van de Craats. He had been lecturer at the University of Leiden, professor at the Military Academy in Breda and then professor at the University of Amsterdam. In the beginning, he had been quite enthusiastic about the Freudenthal reform, and as chairman of one of the committees that were charged with drawing up examinations questions, he had had some responsibility for the developments in the 1980s and early 1990s. But in the long run he became doubtful about their results and he started to sharply criticise Freudenthal's work. Van de Craats gained support from professors of other universities, like F. Keune and K. Landsman from Nijmegen, and M. Pelletier from Eindhoven (Van de Craats, 2008).

The result was a lot of often heated discussions, since the advocates of Realistic Mathematics Education of course defended their positions. The discussion about the teaching of arithmetic, which ran the most heated, led to a request by the State Secretary for Education to the Royal Dutch Academy of Sciences (KNAW) to investigate

the matter. The KNAW appointed a commission with some outstanding mathematicians, like J. K. Lenstra and R. Tijdeman, with specialists in educational research like the Belgian L. Verschaffel, and with field specialists in arithmetic teaching like M. Kool. The main conclusion of the report (KNAW, 2009) was that there was indeed reason for concern, but that there is in fact no hard evidence for better results either for the ‘realistic’ school or for the ‘back to basic’ movement. Another important conclusion was that the quality and know-how of the teacher are the main factors in explaining teaching results, and that it is beyond doubt that in this respect, in the last decades, students enrolled in teacher education for elementary school teachers who had insufficient knowledge of mathematics and did not receive enough education to remediate their mathematical competence. As a result of this conclusion, the demands on arithmetic for future teachers have been raised considerably, a measure that has the approval of all concerned. Another consequence of the discussions on arithmetic teaching was that the government started to implement compulsory tests on arithmetic in secondary education. However, that measure became subject of severe criticism.

The discussion on algebraic skills also had its effects. During the last decade, the emphasis on skills in the final examinations was gradually raised, which had its influence on teaching in school. In the in 2005 established commission for the revision of the mathematics curriculum, the Commissie Toekomst Wiskundeonderwijs (cTWO; Commission Future Mathematics Education), the problem of algebraic skills received more attention than in the years before. While in former curriculum committees, the dominance of the FI and the SLO was considerable, in cTWO that was not the case. The committee was chaired by D. Siersma, a professor of mathematics at Utrecht University and numbered more professional mathematicians, including M. Pelletier, one of the critics of the FI. The committee counted only one member of the FI, P. Drijvers, who acted as the secretary of the committee. Other didacticians of mathematics were also appointed, as well as teachers and representatives of the Nederlandse Vereniging van Wiskundeleraren (NVvW; the Dutch association of mathematics teachers). In a way, cTWO signified the official return of professional mathematicians and teachers and their union to the discussions about mathematics education in secondary school. The work of the committee was critically followed by another committee explicitly appointed by the minister for that purpose. This committee was the so-called ‘Resonance group’, chaired by Van de Craats and mainly consisting of university lecturers and students; another indication of the changing situation.

5.8 A New Start?

The heated and sometimes unfriendly discussions about mathematics teaching also had as a result that the official organisations of mathematics teachers and university mathematicians began to see that such discussions did not enhance their prestige, and that it should be wise to seek ways for mutual understanding and even cooperation.

The Wiskundig Genootschap realised that mathematics teaching in secondary education was also their concern, and that they could not restrict themselves to the realms of scientific research. The NVvW, on the other hand saw that the demands of the teacher education institutions and universities had to be taken into account and that support of and cooperation with professional mathematicians and their organisation would only strengthen their own position. They formalised their new understanding by jointly establishing *Platform Wiskunde Nederland* (Platform *Mathematics Netherlands*), to promote the position of mathematics as a whole and to function as the common voice for the mathematics community.

Except perhaps for some diehards, nobody wants a return to the 1960s and nobody wants to abolish all that has been introduced since then, including the institutions that have been established. But it is also clear that in the future a new equilibrium must be found, not only in the curricula, but also between all involved in mathematics education: the teachers who have to do the hard work, and the experts on both sides, the didacticians and the mathematicians. The indications for such cooperation do not look too bad.

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