3. POSTWAR DEVELOPMENT IN THE NETHERLANDS.

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3. Postwar development in the Netherlands.

Before the last war the development of " pure " mathematics was mainly centered in the mathematical departments of the universities, the Technical University at Delft and the Royal Academy of Sciences, and in the " Wiskundig Genootschap " (Mathematical Society), whereas " applied " mathematics was mainly developed in some other departments of these institutions, in the agricultural school at Wageningen, in some governmental or semi-governmental institutions like the Central Bureau of Statistics (C.B.S.), the National Aeronautic Laboratory (N.L.L.) and the Royal Meteorological Institute (K.N.M.I.), and in the laboratories of some big industries like Philips (Eindhoven) and the Shell Laboratories. There were some links between " pure " and " applied ", but only a few.

Since the war the recent development in other countries sketched briefly above, has had a considerable response in the Netherlands also. Several initiatives were taken just after the liberation of our country (which occurred at the very last moment only, on May 5th, 1945), although some of them came only slowly into effect, partly because we had been cut off from almost all scientific activity during the latter part of the German occupation, and could not obtain foreign literature till about 1946-1947 or even later.

In the first place the number of professorships in mathematics was increased by roughly 50%, and they were made more effective by the appointment of lecturers, instructors and assistants. Also the universities created some (mostly minor) positions for the instruction in mathematical education for future teachers. All this, however, is not characteristic for mathematics alone.

Further, shortly after the war, a new chair in the " Theory of Collective Phenomena " (mathematical statistics), one for (mathematical) logic, two special professorships in the actuarial sciences and one in applied mathematics, were founded at the University of Amsterdam. Later also professorships for statistics at the University of Groningen, the " Free University "

at Amsterdam and the Technical University at Delft, a chair for mathematical economy and econometry at the University of Amsterdam, and a second professorship in the same field at the Economic School at Rotterdam came into being, whereas the Technical University at Delft recently devoted one of its mathematical chairs completely to applied mathematics with the intention of creating a new kind of instruction, viz. of " mathematical engineers ". Also some of the chairs of mathematics in the universities are partly devoted to applied mathematics and new ones are being or going to be created.

Moreover, we mention a few new institutions like the governmental Central Planning Office, the department for (computational and statistical) elaboration of observational results of the (governmental) Organization for Applied Scientific Research (T.N.O.), the Quality Service for the Industry and the Mathematical Centre.

Finally some societies were founded which are closely related to mathematics, like the Society for Statistics (which has a special section for mathematical statistics, and which amalgamated later with an older and less mathematically minded statistical society), the Society for Logic and Philosophy of Science and the Benelux Region of the Biometric Society.

Also several research—and discussiongroups came into being. We mention those on

Asymptotic expansions;
Computing methods and machines;
Communication and information theory;
Biophysics and Cybernetics;
Econometry;
Application of Statistics in Industry;
Standardization of statistical terms and symbols;
Statistical extreme value problems (in connection with the flood prevention);
Storm surges on the North Sea (ditto);
Teaching of mathematics;
Renewal of education.

The Mathematical Centre, mentioned above, was founded in February 1946, on the initiative and according to the plans of three " pure " mathematicians. Its purpose was: to further the development of applied as well as pure mathematics in the Netherlands, and, in particular to bridge the gulf between mathematics and its applications by, on the one hand, inducing mathematicians to bring forward their results in a form easily understandable by " appliers " with scanty mathematical training, and, on the other hand, teaching such " appliers " the special mathematical results and techniques they have need of. Its leading principle may be described as " multilateral cooperation ". From the very beginning the Mathematical Centre enjoyed enthusiastic support from many sides, in particular also from the government. It rapidly gained impetus, in particular since the computation department and the statistical consultation got leaders who in a few years became prominent in their fields. It is a foundation, independent of the universities, supported by the government (through its organizations for Pure and for Applied Scientific Research), the municipality of Amsterdam, and, to a small extent, by some big industries. At present it has a personnel of about 80, some of these half-time graduate students.

It has four departments, cooperating closely together, viz. for

Pure mathematics,
Applied mathematics,
Statistics,
Computation,

and a threefold task, namely:

Research,
Education,
Consultation.

The educational task is performed only in such fields and such cases which are not covered already by the universities. It is done by: *a)* organization, preferably in cooperation with other institutions, of colloquia, research and discussion groups, *b)* training mathematical students in consultative work,

c) courses for non-mathematicians, *d)* methodological statistical instruction of non-mathematical workers by consultation and by methodological sections in statistical reports on concrete problems.

Consultation is done partly on a non-profit cost-price basis, partly (in particular for university laboratories all over the country) free of charge. It comprises often extensive elaboration of observational results, testing of observational evidence, design of experiments, computing, development in pure and applied mathematics, etc.

Research is done in everyone of the four departments, and comprises also design and construction of computing machines.

In order to give an impression of the variety of subjects treated, a list has been added in the appendix of subjects dealt with in consultation during 1953.

4. Flood prevention problems.

On February 1st 1953 the South Western part of the Netherlands, and, to a lesser extent, parts of England and Belgium, were struck by a flood disaster, which exceeded by far any one hitherto observed. It cost in our country over 1750 human lives and far over 10^9 guilders of material losses. On the other hand it gave rise to one of the finest examples of international helpfulness known in history.

In order to find out the best methods for preventing, in asfar as possible, a similar disaster in future, the government immediately appointed a committee, consisting of the most prominent hydraulic engineers, called the " Delta-committee ", because its realm is the delta, formed by the rivers Rhine, Meuse and Scheldt.

The reason why all this is mentioned in this report is the fact that it gave rise to a number of mathematical and physical problems. For solving them the Δ-committee appointed as advisory institutions: the meteorological institute K.N.M.I., the hydrological laboratory of the Technical University at Delft, the (governmental) Central Planning Bureau and the Mathematical Centre.