

## Some of IUTAM's history

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In the beginning was Theodore von Kármán, professor in Aachen (Germany), who had the strong feeling that scientists in the field of fluid mechanics should meet each other. The time was 1922, a period in which the ravages of World War I were still present and scientific congresses were still rare. Nevertheless, Von Kármán succeeded and some thirty people, all Europeans, met in Innsbruck to talk and listen.

One of those present in Innsbruck was the Dutch mechanist C.B. Biezeno. In his opening speech at the Tenth International Congress of Applied Mechanics, held in Stresa (Italy) in 1960, he remembered:

"The origin of our Congresses must be sought in a conference held in Innsbruck in September 1922 to discuss questions of hydrodynamics and aerodynamics. This conference proved to be a great success, a fact that may chiefly be ascribed to the personal qualities of von Kármán, who bestowed so much care on its organization. I cannot refrain from expressing my gratification that von Kármán is in our midst ... For it was von Kármán who suggested that an International Congress might be held on a wider scale, including the whole domain of applied mechanics. The Netherlands was considered to be the most appropriate country for this Congress, and Delft the most appropriate meeting place. The organization was entrusted to Prof. J.M. Burgers and myself. During that First International Congress of Applied Mechanics in 1924, the Executive Committee convoked a meeting ... to discuss the further development of the Congress organization. There and then the following decisions were taken: 1. A permanent institution was to be constituted: The International Congress for Applied Mechanics. ... 3. A permanent International Committee was to be formed ... This Committee, which could coopt other scientists, would decide upon general matters relating to the Congress. 4. The organization of each new Congress was to be entrusted to a National Committee which would draw its members ... from scientists of the country where the meeting was to take place."

Despite the still mixed feelings about Germany, especially from the French, the First International Congress for Applied Mechanics was a success. 207 Scientists gathered there and presented some fifty papers; the French were absent. For the announcement of the Delft Congress, the Dutch/American mathematician Dirk Struik (an old friend of Burgers') wrote a kind of press report (in Dutch) which can be found in the Dutch State Archives:

"It is not impossible that the announcement of an international congress for applied mechanics in Delft has the same impression as the announcement of an international congress on the study of starfishes. For mechanics is regarded as a modest part of the mathematical and physical sciences and the restriction of 'applied' mechanics may imply that this is a congress of extreme specialists, an awful example of the ongoing crumbling of the already heavily subdivided sciences. By means of this congress, applied mechanics shows itself as a full-fledged field beside other main fields of science. As part of applied mechanics one considers those applications of mechanics, which the technician or engineer working in science needs. Nowadays, one mainly discerns the following parts: the theory of stability and vibrations, the theory of elasticity, hydrodynamics, and aerodynamics. Apart

from these, other fields are studied: the resistance of ships, seismic problems, turbine construction, the structure of crystals, and meteorology. One of the main causes of the turn of the position of applied mechanics has been the Great War, principally thanks to the development of aeronautics. This congress, therefore, has more than the usual meaning. So far as it demonstrates the flowering of applied mechanics, it demonstrates this postwar period. So far as the most prominent scientists show the many-sidedness of the problems and some of their solutions, it helps in strengthening the old tie between theoretical and applied mechanics. So far as it is the first really international congress in the exact sciences since 1914, it may help in removing the alienation between the researchers of different countries, who – despite everything – have never been able to do without each other.”

After Delft, the second Congress took place in Zürich. This was in 1926 already in order not to have the event coincide with the International Mathematical Congresses. Then followed Stockholm (1930), Cambridge UK (1934), and Cambridge USA (1938). The War put an end to this list of successful meetings and only in 1946 was it possible to meet again, in Paris, though circumstances were still difficult.

During this Sixth Congress in Paris, Professor Jan Burgers showed up with a plan to set up a new body, which would not only be engaged in the organization of the Congresses but would also stimulate the field of mechanics in several other ways. The plan to found a Union had originally originated from the International Council of Scientific Unions, as appears from a letter by Burgers to G.I. Taylor of January 18, 1946:

“Stratton [a British scientist] in his capacity of general secretary of the International Council of Scientific Unions, has proposed that the Congress of Applied Mechanics should transform itself into a Union, so that it has a more permanent character and could adhere to the International Council. When we should have a permanent bureau, it would become possible that either the International Council itself or other Unions could approach us in cases where a cooperation is desired in a field, covering also the domain of mechanics. It is taken in view e.g. to form a joint international committee on viscosity and related matter, out of delegates nominated by the Union of Physics, the Union of Chemistry, the Union of Biology and, if it exists, the Union of Applied Mechanics. Also the formation of a joint committee on matters relating to the dynamics of the earth is taken in view. The transformation into a Union would in no way interfere with the management of our matters and with the organization of our congresses, nor with the question whom we shall admit as members. The permanent bureau could be formed out of the existing International Committee, which could send delegates to the meeting of the International Council. It will be necessary to pay a contribution to this Council, but that is the only duty. Biezeno and I are writing about this matter to the french organisational committee. In view of the fact that there will be a meeting of the International Council at London ..., it would be rather a nice thing if already a provisional delegation could be sent in July of this year, although a formal approval by the Congress itself can be obtained only in September. I hope that the plan of transforming the congress into a Union may have your approval. Perhaps you could talk this matter over with our American colleagues, when you will be in the U.S.A.?”

Taylor answered Burgers one week later: “I am not quite sure about the advisability of making the Applied Mechanics Congress part of the International Unions. I dare say it is the right thing but I think the matter should be discussed well ... If I see Karman, I will ask him

what he thinks." H. Villat, head of the "french organisational committee", wrote Burgers in June 1946 that he had written several of his colleagues on this matter and had met general approval.

The direct motive for the foundation of IUTAM was simple. From the Delft Congress onwards, the organization of the Congresses was carried out by a national committee of scientists from the country where the Congress was to be held. Only during the events did the International Committee meet to discuss matters related to the organization of the Congresses. In the interval between them, the Committee had no duties and was inactive. Only when the next Congress was drawing near, correspondence started on the organization, topics, etc. At the meeting of the Congress Committee during the VIth Congress in Paris in September 1946, "it was decided to create a more permanent organization, so as to provide the possibility of carrying out activities in the interval between the congresses".

The first meeting in Paris was on Sunday, September 22nd in the famous Sorbonne. The people present were: H. Villat, M. Roy, J. Pérès, A. Caquot, K. Popoff, R.V. Southwell, G.I. Taylor, C.B. Biezeno, J.M. Burgers, J. Ackeret, R. von Mises, J.P. den Hartog, and Th. von Kármán (also some Russians were members of the Council at that time – among them Kolmogorov – but contact with them appeared difficult at the time).

In a report of this meeting, we read: "The president [Villat] then introduced the proposal for the creation of a permanent organisation, in the form of an International Union of Theoretical and Applied Mechanics. Prof. Burgers gave an exposition of the objects of this proposal. He drew attention to the existence of the international unions for Physics, Chemistry, and for Geography, and pointed out that the foundation of a more permanent organisation for the science of mechanics would make possible cooperation with these Unions and with other scientific bodies (e.g. editorial bodies) in the intervals between our congresses. ... It would be necessary to create a permanent Bureau, which should represent the Union, keep its archives and act in matters of cooperation with other organisations. This Bureau, which in fact would be the executive organ of our International Committee, could also prepare or arrange discussions on the policy to be followed in the international congresses; eventually it might undertake publishing activities etc. Its statutes should be kept as simply as possible in order to retain a maximum of freedom in its activities."

The French delegates expressed their sympathy over the plans and a discussion arose on the question how the proposal should be discussed and approved. The British, however, had some doubts. They feared that the creation of a Union might bind them in an "undesirable" way. They remarked that "the success of our series of congresses has proved that our general traditions with regard to the simplicity of organisation, the choice of subject matter, the admission of members, and the way in which we have arranged to keep out of all political controversies, have worked very well". Other members of the International Committee appeared to share these views.

It was decided that Burgers would draft a set of statutes and that he should discuss these with the British members before it would be submitted to the Committee. The next few days, Burgers discussed his proposal with several members, including the British mechanist Southwell. Burgers was able to bring the statutes into such a form that the

British objections were evaded. It was decided that the secretary's activities would be as few as possible, so that no fund raising would be needed. A new feature was the possibility of 'adhering organizations' to become admitted to the Union. At the second meeting, on Thursday, September 26th, 12.30 p.m. it was unanimously decided to found IUTAM in the spirit laid down in the draft statutes. Burgers was appointed secretary. Due to lack of time, it was decided to vote upon the statutes by correspondence. The former International Congress Committee would act as the so-called Council of IUTAM. As the date of the next Congress provisionally the year 1950 was chosen with a small majority. According to the report, "the discussion oscillated between the labour involved in the preparation of a congress, and the feeling that there still is a great mass of important new results which could form appropriate subject matter for a congress in 1948".

In the draft statutes (of which the French version was considered the official one), some of the most important objects were formulated thus: "II. The objects of the IUTAM are: a. to continue the series of International Congresses for Applied Mechanics; b. to engage in other lawful activities meant to promote development of mechanics as a branch of science, viz.: formation of committees or bodies for special purposes; organisation of meetings or conferences; entrance into relations with other scientific organisations; editorial or publishing work; any other activities which may be deemed suitable to the purpose indicated. ... XI. In all its decisions the Council shall be guided by the tradition of free and international scientific cooperation which has been developed in the International Congresses for Applied Mechanics."

The 26th of September 1946 has been the day of the formal constitution of IUTAM, as Burgers informed the members in the first circular letter of IUTAM of January 1947. In the third letter of May 1947, Burgers announced that voting by correspondence had resulted in an approval of the Statutes. An application had been sent to ICSU for admission. In the circular letter of June 1947, it was mentioned that ICSU had accepted IUTAM as adhering body. In September 1947, in view of the Congress of 1948 (the choice of this year instead of 1950 was partly due to the fact that in 1950 the International Mathematical Congress would take place), a provisional Bureau was chosen: R.V. Southwell as acting president, H. Villat as acting vice-president, Hugh L. Dryden as acting treasurer, and J.M. Burgers as acting secretary.

IUTAM had been founded, as Burgers had wished for, but at the beginning of 1948 he seemed a bit disappointed about its activities. In a letter to Von Kármán of February 7, he wrote: "A difficulty which I have been feeling for some time is that we [i.e. IUTAM] have no programme of work outside the international congresses. There seems to be no great desire for joint work in this domain, or people think that in case anything would turn up, it could be organised just as well outside the Union. But could we not organise international symposia at some time between the congresses?" And two weeks later, he wrote: "It is quite certain that the Union must find its bases in organisations in the various countries; it now floats in the air and has no definite aims between the congresses. I feel a bit at the end of my wits."

This question of adhering bodies was one of the key issues during the first full meeting of the Council which took place during the VIth International Congress in London in September 1948. There, a revision of the Statutes was accepted and the Bureau and some

committees were nominated: the French scientist J. Pérès as President, Southwell as Vice-President, Dryden as Treasurer, and Burgers as Secretary. A representative from UNESCO (the 'scientific and cultural branch' of the United Nations) also attended this meeting. During the meeting a new text was proposed for article II.a of the Statutes: "to form a link between persons and organisations engaged in scientific work (theoretical or experimental) in mechanics or in related sciences". It was also proposed that the term Council should be replaced by General Assembly. The British proposed that the International Committee which organised the Congresses, should become an adhering organisation of IUTAM but remain independent, as in the past. (In 1950 the Royal Society proposed to abolish the Committee; Burgers, who had always been opposed to its existence, this time didn't want to change anything as he saw the proposition as an attempt to gain power by the British.)

Several other points were discussed. Some suggested that the International Committee should just be a committee of IUTAM, while S. Goldstein proposed to change the name of IUTAM to International Union for Mechanics. Another point on the agenda was the "participation of scientists from former enemy countries in activities of the International Union and at congresses". The British proposed that IUTAM would become affiliated with an International Union of Mathematics if one should be founded. Also, several committees were installed during the meeting. One "to consider the provision and activities of computing laboratories". Another to "collect and compare data on the internal damping of materials, parts of structures, and complete structures". And a third "to enter into relation with the International Astronomical Union for the planning of a joint symposium on problems of stability of rotational motion, turbulence, convection and wave motion in gaseous masses of astronomical dimensions". It was decided to leave the committees free "to co-opt members from ex-enemy countries and to admit scientists from such countries to meetings arranged by them".

The same year, the first Adhering Organizations showed up: Hungary and the UK. In 1949 other countries followed. Among them was France, even though initially Pérès had objected to membership of France. Burgers argued that if the national organizations did not adhere to IUTAM, it would become a very autocratic body and the basis would be too small. Pérès proposed that the members of the Council should set up an organization in their own country, but Burgers thought this to be an impossible task.

By 1952, already 18 countries had Adhering Organizations. Burgers, who was now IUTAM's official secretary, tried hard in executing plans for cooperation. Several suggestions were made: a joint study on viscosity and plasticity, on nomenclature and normalisation, on combustion etc. A project of a somewhat different kind was the foundation of already mentioned "calculating laboratories".

Burgers' involvement in the Union of Physics led to the foundation of the Joint Committee on Rheology in 1947. His personal acquaintance with the President of the International Astronomical Union led to the above-mentioned joint congress on hydrodynamical problems in astronomy in 1949, which can be regarded as IUTAM's first symposium. The 1950 colloquium on "plastic flow and deformation within the earth" organized by IUTAM and the International Union of Geodesy and Geophysics was also largely the result of Burgers' involvement and his personal acquaintance with the latter's president.