

Congresses

Stephen Juhasz and Peter Eberhard

A. Summary

During the past ninety-three years, one “initiating conference” and twenty-four international congresses—first under the name Applied Mechanics and later under the name Theoretical and Applied Mechanics (ICTAM) were held at about four-year intervals on four continents and in nineteen countries. The participants were primarily from academia, but there was always industrial support and some industrial participation. The number of countries represented by participants increased from seven in 1922 to fifty-seven in 2012. During the past ninety-three years, some 10,150 presentations were made in a multitude of formats. There were keynote and general lectures, “conversaciones” (research exhibits with refreshments), contributed papers, poster sessions, etc. Comparing the 1924 and 2012 Congresses, the number of participants increased more than sixfold and the number of papers presented nearly 22-fold. This does not give the full picture. Both participants and papers fluctuated greatly. The congress with the maximum number of participants was not the one with the maximum number of papers. The unusual 11-fold increase in participants (2250) at Moscow was due to the large size of the host country, intensive research activity, and consequently extraordinary number of local registrants. The number of participants from non-host countries varied between 440 and 1321 during the last 15 congresses. The total number of registrations was around 20,000 (number of individuals fewer because of repeated participations). The large increase of papers at Bruxelles (511) was due to a relaxed

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acceptance policy for contributed papers. Altogether up to the year 2008 thirty-eight volumes of proceedings have been published with a grand total of 16,748 pages and combined shelf length of over one meter, see the photos. The Beijing Congress 2012 was the first one where the papers were published only electronically as an e-book in the *Procedia IUTAM* series.

Although the history of mechanics goes back to Archimedes no fraternity of applied mechanics existed until ICTAM. It was ICTAM that gave a feeling of kinship, in bringing about a framework for free exchanges and crossfertilization of ideas through face-to-face contacts as well as through publication of results. Actually ICTAM brought about a blossoming of applied mechanics, not unlike the Renaissance in arts and letters of the 15th and 16th Centuries. Without the contributions of 20th Century “mechanicians,” current technology and living standards would be impossible.

On an international level, the accomplishments were just as great. After WWI, scientists who were natives of both Allied and Central Power nations convened. Likewise shortly after WWII, the scientists of the former enemy countries got together. During the then arising East-West differences, congresses were held regularly and scientists from capitalist, socialist, and third-world countries exchanged ideas freely. During the nearly ten decades an “*esprit des mécaniciens*” gradually developed. The international congresses were also the catalyst for the establishment of national congresses. There are several countries worldwide that regularly hold such national congresses. Also, regional series of meetings were initiated, such as *Euromech* or *ECCOMAS Colloquia* and various national mechanics congresses, held e.g. in Italy, Germany, Bulgaria, Poland, USA, Russia, China. Last, but not least, some thirty IUTAM symposia are held between two consecutive congresses. This would not have been possible without the nearly hundred years tradition of ICTAM/IUTAM.

The nature of the congresses changed. In the beginning it was the only medium for information exchanges in the broad field of mechanics. Increasingly, the congresses played an additional important role as a forum for people working in mechanics to meet. However, the published proceedings of the congresses contain a storehouse of composite knowledge, as well as some new material, thus the congresses served as a reference point to report and assess the progress that had been made.

B. When and Where

1. Usual Cycles and Deviations

The original idea was to hold a congress every fourth year. This attempt had to be compromised three times. After the first congress in 1924, it was realized that some of the participants in the International Congress of Mathematics (ICM) would also

have come to the ICTAM (International Congress of Applied Mechanics) if they had been held in different years. This recognition caused the two-year interval between Delft (1924) and Zurich (1926). The second deviation was caused by WWII. In 1938, in Cambridge, USA, during the V Congress, it was announced that the city designated for the VI Congress in 1942 was Paris. This was impossible, and the first opportunity to hold a congress in Paris was 1946. There was, thus, an eight year hiatus. This again caused a conflict with ICM. So another exception was made, and the VII ICTAM was held in London in 1948. There were thus two, two-year shortenings and one four-year expansion. Since the VII ICTAM Congress in London, all congresses have been on schedule as if the three “deviations” had not occurred.

The length of the congresses varied between five and eight days. Most of them started on a Sunday or Monday. The longest congress, held in Istanbul, lasted eight days. It started on Wednesday and included the weekend (to the delight of the participants). Quite a few later senior engineering scientists who were in Istanbul in 1952 were graduate students or young faculty members at the time. The majority of the congresses were held in late summer. There were two exceptions: the first Delft Congress was held on 17–26 April, and the Cambridge UK Congress was held between 3 and 9 July.

2. Countries and Cities

Most of the 24 congresses were held in the northern hemisphere, on two continents: Europe and North America. The organizers cannot be blamed for bias. All originators of mechanics congresses were Europeans, and before WWII, there was little significant mechanics research activity on other continents. In recent years this changed and congresses were held in Haifa/Israel, Adelaide/Australia, Beijing/China and Kyoto/Japan. This improves the geographic representation and involves more national mechanics communities. There were four countries which each hosted at least two congresses: the Netherlands, England, France, and the USA. (The locations of symposia, as distinct from congresses, became global already within the first two decades.) Many of the congresses were held in large cities, such as Stockholm, Paris, London, Moscow, or Beijing. Most of the others were held in university cities such as Cambridge, Stanford, Adelaide, and Lyngby. One congress was held in a resort, Stresa. The initiating conference, sometimes called the “0th Congress,” was also held at a resort in Innsbruck.

It could be thought desirable to move the geographical locations of each congress as far as possible from the previous one, e.g. moving even between continents. However, maybe it will need some more time before we see the first ICTAM in Africa. Of the congresses held, there were only four early occasions when the location of a congress was less than 1000 km from that of the previous one.

3. Congress Organizations

The organization of congresses is nowadays the duty of two groups: the Congress Committee [and there especially the Executive Committee of the Congress Committee (XCCC)] and the Local Organization Committee (LOC). The duties of both groups are numerous, and the degree of success depends greatly on the thoroughness of the planning, which some feel should start as early as the end of the previous congress.

Of the organizers of the congresses, a few individuals should be named whose activity was extraordinary. Dr. von Karman's vision and the contribution of well-selected associates created the "zero-th" and the first congresses in Innsbruck and in Delft. These are described in more detail in the preceding contribution by G. Battimelli. The chief organizer and "martyr" of the VIII Congress, held in Istanbul, was E. Kerim who died a few months following the congress. Some details of this congress are outlined in "Socials."

Although the success of the Stanford congress in 1968 was due to several persons, N. Hoff, who has been active in ICTAM/IUTAM congresses since 1946, deserves the major credit. The preface of the proceedings of this congress contains the multilingual introductions of major organizers. Hoff's performance at the opening of the congress was a masterpiece of international diplomacy. To overcome the difficulty of providing a sufficiently large European participation at Stanford, the congress president raised, from U.S. government sources, contributions for a round trip charter flight from Amsterdam to Oakland. The entire organization of the transportation of some 150 scientists from Europe was in the hands of the secretary of the Congress Committee. This was the largest organized movement of people over a considerable distance in the history of these congresses.

Later, the Chicago Congress in 2000 was very impressive. Besides being held at an interesting place, the Congress President H. Aref spent many thoughts to create a program adequate to the millennium change. Actors took the stage to comment the history of mechanics and the reception was held in a beautiful museum.

Because the activity of the LOC is so multifaceted, the availability of a manual is most useful. The "little green books" prepared by the Toronto organizers contained job descriptions, both technical and social.

C. Meeting Places, Residences and Transportation

1. Congress Locations and Facilities

The majority of the early congresses were held at universities. Here lecture rooms were usually the scene of contributed lectures, and auditoriums were used for general lectures and for opening and closing sessions. They were all indoors, with the exception of Stanford where the opening session was held in an excellent outdoor concert facility. Among the universities, the Lomonosov University in Moscow

deserves special mention. This interesting “towering building” is the largest university building in the world, which permitted all lectures to be held under one roof, with but one exception: the opening session, which was held in a Kremlin auditorium.

There were several congresses where the meetings were not held at universities. The first was in Stockholm in 1930. Originally, the congress was supposed to be held at the Royal Institute of Technology. Due to a much higher preregistration than expected, the venue had to be changed. The lectures were held in the Swedish Parliament Building. The next congress not held at a university was in 1960, in Stresa, in the beautiful building of the Palace of Congresses. The third non-university building where a congress was held was the Congress Hall of the Deutsches Museum in Germany in 1964. This museum is one of the oldest technical museums in the world, and the proximity to the museum contributed greatly to the interest and the pleasant memories of the participants of the XI IUTAM Congress.

Later, because of the larger number of participants, more and more congresses were held in conference centers or big conference hotels. They offer usually great facilities intended for so many participants but on the other side the academic atmosphere of a university cannot be provided there. Certainly in the future less and less ICTAMs will be held at universities.

A very important place for the “one-to-one” or small-group scientific discussions were the coffee rooms. If any generalization can be made, the provisions for these was excellent at most congresses. Usually, large rooms with free coffee were available. At several congresses there was also provision to get pastry or sandwiches. Occasionally, there was also a piano, and there were frequently registrants who did not hide their musical talents. The lunches were usually cafeteria-style and quite fast.

2. Logos, Banners and Signs

It is not known when the use of “logos” started. Since the sixties, however, several congresses had a logo displayed, usually on a large horizontal banner, with a text such as “XV International Congress of Theoretical and Applied Mechanics.” Such banners were usually placed on the front of the building where the registration was held. The logos were also displayed on programs, letterheads, nametags, etc. The Munich logo was the outline of the most famous church tower of that city. The Moscow Congress had two logos: the one on the nametag showed the outline of the Lomonosov University and textual information; the logo on the banner was circular, resembling a globe with the words “IUTAM” and “Moscow 1972” horizontally and “International Congress” on the circle. The logo of the Toronto Congress was more technically oriented. It was selected by the local arrangements committee from a number of submitted designs. They called it a “stylized version of the symbol for infinity.” It is actually a two-dimensional representation of the “Moebius Strip”. The circular logo of the Lyngby congress was interpreted by some participants as a ball bearing, by others as boiling water, or solid particles suspended in fluid. Actually, the local arrangers wished to represent the front end of a

bronze horn used in Scandinavia some 3000 years ago. Two replicas of these horns were used at the opening ceremony. Later, logos often showed famous buildings like the Great Wall 2012, the Chicago skyline 2000, or local temples 1996. No previous logo was repeated. Although maybe not a “logo” but a symbol of a historical person, the picture of Euler was engraved on the registration folder given out in Zurich in 1926, with an implication that he was born and educated in Switzerland and was a scientist living and working in other countries and thus typified a great international scientist.



XI Munich 1964



XII Stanford 1968



XIII Moscow 1972
Used for banner



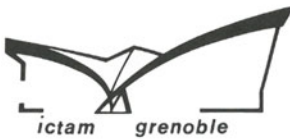
XIII Moscow 1972
Used above nametag



XV Toronto 1980



XVI Lyngby 1984



3. Residences and Meals

The participants usually stayed in hotels. As the character of the composition of participants changed when the number of delegates increased, so did the range of residences. At later congresses, first-class hotels, lower-rated hotels, and dormitories were used. At the earlier congresses, the participation of graduate students was an exception rather than general. They were usually housed in private homes.

The distance between the congress buildings and the nearest and farthest residence varied greatly. In Stresa, the longest distance was a 5-min walk. There was, however, an exception. Some latecomers such as G.I. Taylor were housed in a distant hotel. He was a good sport and once accepted a back seat on a motorcycle with M. van Dyke to get to his lecture. The other extreme was when the delegates had to take a train from the university city but were housed in different cities, which excluded an evening get together on nights without organized programs. There were complaints at several congresses about hotels, but there seems to be no correlation between their size and the price of accommodation and quality of service. An example of a congress where both the large hotels and small “albergos” were really excellent was Stresa. The question of residence is, of course, irrelevant for those who live in the congress city.

4. Transportation

At most congresses the transportation (where needed) was by special bus. There was usually no problem in the morning and at the end of the day, but during “unofficial” times the waiting was sometimes long. Transportation by rail and bus in Lyngby in 1984 was frequent and reliable, and most of the congress hotels were within walking distance of the interesting railway stations in Copenhagen. Nevertheless, the coming and going took nearly 2 h. The alternative, however, would have been to hold the meetings in Copenhagen in a convention center where the meeting room would not have been free (unlike the Technical University in Lyngby at that time); thus, the registration fee would have been much higher. In Munich, excellent street cars provided transportation through the beautiful city from the island on the river Isar to the railway station, near which most of the congress hotels were located.

5. Weather

Congress organizers are responsible for all aspects of the congress except the weather. Occasionally, some irate participants blamed even the weather on the organizers. It is worthwhile to name some good and some difficult weather

conditions. The California weather permitted the outdoor opening ceremony and, on a later day, an outdoor dance at Stanford in 1968. The weather, not always reliable in England even in the summer, was exceptionally fine throughout the whole 1934 Cambridge UK Congress and made the evening functions on the college grounds particularly enjoyable. The weather in Istanbul was over 38 °C on the day of G.I. Taylor's keynote speech. Both the speaker and the audience had ties and jackets on. Sir Geoffrey quickly noticed the suffering of the audience, and removed his tie and jacket which "broke the ice" and the audience followed suit. Similar hot weather, with a forest fire 100 km from Moscow, caused difficult conditions during the XIII Congress in 1972. This was an unusual situation.

D. Participants

1. Number of Participants

The number of participants, at each congress as shown in the appendix, was extracted from the published itemized list of participants in the proceedings or from the IUTAM reports. The lowest number was 207 in Delft in 1924, and the highest number was 2250 in Moscow in 1972. In the post-WWII period, there was a great decrease between 1972 and 1976. In Delft, the participation was 1005. The major reason for the decrease was that more than half of the Moscow participants were from the USSR, while only seven participants came from the USSR to Delft. The Toronto registration was also lower than expected, mostly due to a decrease in European participation because of high travel expenditures. Later in Chicago (1430) and Warsaw (1515) the numbers increased greatly again. The number of out-of-country participants fluctuated between 440 and 1321 during the last 15 congresses and their percentage between 34 and 95 %.

2. Number of Host Country Participants

It is obvious that the fraction of registrants from the host country will always be considerably larger than usual. A congress held near home is an excellent opportunity for young engineers and scientists to hear presentations by the great mechanicians, and perhaps even to shake their hands and hear their jokes at lectures or functions. We computed the fraction of the number of locals. The lowest host country participation, as shown in the appendices, was 5 % in Bruxelles. This is not surprising as the population of Belgium is one of the smallest of the 19 countries where a congress was held. The other extremes were the USA (72 and 66 %) and in the USSR (63 %).

Stanford and Moscow and later Delft, Chicago, Warsaw, Adelaide, and Beijing had over 1000 registrants. Such a large attendance has both favorable and less favorable aspects. It should be recognized that if a congress is held in a large, technologically developed country having many research engineers and scientists, the “Locals” inevitably decreases the international flavor compared to a congress that is held in a smaller country.

3. Travel Grants and Other Support

Already before WWII, it was recognized that some graduate students (or researchers) should be included among participants. Travel grants were issued by host organizations, such as by a college in Cambridge, UK and the Royal Society. Later, IUTAM gave support again and again. Some governments, for example the Turkish Government, gave support such as free dormitory space. About 5–10 % of the participants of some congresses came with such a travel grant as here mentioned. An unusual indirect travel grant, as mentioned earlier, was given to about 150 Europeans who came to Stanford and returned by chartered plane from the Netherlands paid for by different US agencies.

4. Founders Participation

T. von Karman participated consecutively at 1 + 10 conference and congresses. J. Burgers participated in nearly all congresses starting in 1922. His last participation coincided with the second Delft congress in 1976. G.I. Taylor was recognized in Stanford as having presented at least one paper at all congresses from I through XII. Incidentally, this was his last participation. C.B. Biezeno participated at I–XI and, though not personally present, sent a greeting cable to the XII Congress.

5. Nature of Participation

If the list of registrants of ICTAM/IUTAM is perused and compared with group pictures of I and VII Congresses (as shown in the appendix), it is interesting to see the gradual decrease in the age of persons who attend the congresses. Originally, only recognized leaders in the field participated, see General and Sectional Lecturers: I Delft 1924 in the appendix. The reason behind this gradual change is twofold. One is that in the beginning the congresses were the outlet for scientific research, and publication was only for the “in people.” The other reason is that, since 1934 (Cambridge UK), the International Congress Committee agreed that:

... the Congress should not be viewed as a publishing body but rather as a meeting of people; papers therefore should not be accepted from members who have no intention of attending the congress unless adequate steps are taken for the reading of the full paper by someone conversant with the author's work ...

6. List of Participants and Name Tags

If a person comes to a congress, it is important for him or her to know who else is there and who are the persons from a given country. Also, it is useful to know the affiliations. Of course, it would be highly desirable to have the information at the beginning of the meeting. Two tools are used to accomplish these purposes: the list of participants and name tags.

At the Innsbruck conference, with some thirty participants (including family members), the solution was trivial. Everybody wrote by hand the name, city, and hotel name. A scan of the original list is included in G. Battimellis chapter. At a meeting with over 1000 persons, this of course is out of the question.

An excellent system was used in Lyngby during the XVI Congress. At the time of the registration, three computer-prepared lists were supplied that contained all the information given above, with the exception of affiliation and address. There was an alphabetic listing of all names (family name first) followed by country; then there was an alphabetic listing by countries with subalphabetization of the names; finally, a listing by hotels again subalphabetized by family names of participants. This list, which was available at registration, included all persons who preregistered. A few days later, a supplementary list was published. It is worth mentioning that the III Congress (593 registrants), held in Stockholm, had a program in which the pre-registrants' names, addresses, and affiliations were given with photos of themselves and spouses if present. It was printed on a glossy paper.

The name tag and its usefulness or uselessness depends greatly on the readability. There were several congresses with excellent readable name tags, such as the XV Congress in Toronto. One of the reasons for unreadable or difficult to read name tags is the use of regular too small letters to accommodate fully the given name, family name with country, and affiliation.

With increasing sensitivity with respect to providing personal data, however, many participants would nowadays not like to provide info about private address or used hotels.

7. Photos

Group photos of congresses were feasible when the number of participants was small. Photos of some early congresses are available. The last group photo was

taken in London in 1948. Of course, making group photos of the entire set of participants is no longer feasible.

At later congresses, in lieu of group photos, a multitude of photos were taken by the official congress photographer, who came to coffee breaks, socials, and excursions. These were displayed a few hours later in the registration area where they could be ordered. Examples of interesting group pictures taken by an official photographer show von Karman with the Japanese delegation on the steps of the Université Libre in Bruxelles in 1956, and Academician Sedov with von Karman on an excursion boat on the Lago di Maggiore in 1960.

Alas, there were several congresses where there was no official photographer. Even in these cases, pictures were taken by some participants, but these were not displayed in time; also, they could not be ordered. The photos displayed in the last part of this book are often taken by official photographers and by congress participants.

E. Presentations

1. Numbers

Due to increased scanning, the number of papers presented has first not increased as in some other scientific fields. As a matter of fact, the number of papers at the first congress was 58, and the number of papers in the post-WWII Congresses was around 300, with the exception of IX Bruxelles (511). The number of papers rose to over 1000 at XX Chicago and the following congresses. This was partially due to the fact that most participants do not receive travel support from their home institutions if they do not present a talk or poster.

2. Formats

In Innsbruck, there were just “lectures.” This expanded in I Delft to general and sectional lectures. Then at IV Cambridge, UK (1934), the format was expanded and contributed papers were accepted. Since then, the bulk of the papers presented were contributed papers. At one congress, some of the contributed papers were given more presentation time than others. The contributed papers belonging to the first category were published, and papers belonging to the second category were just listed by title. During the last congresses, some of the contributed papers were presented, but others were displayed and discussed at poster sessions. This is always causing a lot of discussions and some people consider posters as a ‘second-class’ presentation.

During the past congresses, during the contributed, presented-paper sessions, “special emphasis” sessions were held. Superficially, they appear to be symposia embedded into congresses. This was, however, not the intention of the arrangers. For example, at Lyngby in 1984, there were three such topics: Marine Structure, Wave Interaction, Micromechanics of Multicomponent Media, and Development of Chaotic Behavior in Dynamic Systems. The original purpose of these sessions was to bring persons of different disciplines together.

Poster sessions can be very useful and are the “children” of the “conversazione” type meetings held at the 1934 and 1938 congresses. The poster papers were treated differently from the contributed papers, not only with regard to mode of presentation but also of publication. Poster papers were listed only by title in alphabetical order of the author.

The list of most authors of keynote and/or general lectures, with congress designation, is given in the appendices. Another appendix lists the general and sectional papers presented at the first congress.

3. Acceptance Policies for Submitted Papers

Although keynote, general, and sectional papers were always invited papers, contributed papers, as the name indicates, were usually unsolicited. They went through some screenings by methods varying in severity, but it appears that the activity of the members of the Papers Committee (later the Congress Committee and again later the International Papers Committee) consisted of only a go/no-go decision, rather than a traditional refereeing.

There are no records about policies of screening. It is known that before the V Cambridge USA, 1938 Congress, a program committee was established composed of S. Timoshenko, H. Dryden, J. den Hartog, and H. Peters, who read the abstracts of the contributed papers and selected those to be presented. It appears that the high number of papers in Bruxelles was due to the fact that nearly everything was accepted. The chaotic result of the acceptance of virtually all submitted papers at the Brussels Congress led the Congress Committee to establish a Papers Committee (consisting of M. Roy, E. Becker and W. Koiter for the Stresa Congress). In the screening there are two considerations which sometimes conflict. One is the quality of the paper, and the other a striving for wide international participation without dominance of a few countries. The paper committees of both XII Stanford and XIII Moscow were much stricter than that of IX Bruxelles. Only one of five of the contributed papers was accepted for Stanford and one of six for Moscow. At Stanford the ratio of presentations to participants was 21 % and at Moscow 11 %, as compared to the average figure of all congresses of 44 %.

The task of the International Papers Committee is far from easy and it has been always assisted by a pre-selection of papers in the major countries by their national committees. Responsibility for the final decision has always remained with the International Papers Committee.

During a closing session of one of the congresses, the chairman of the LOC asserted that the slides used in the lectures were poor. This had a beneficial effect in two future congresses (XV and XVI). Potential authors were advised that the acceptance (or rejection) of papers would be based not only on manuscript of the papers but also on the drafts of the slides. Later this strategy was changed again and the evaluation in the last decades was based on a short abstract.

4. Languages

Each congress has “official languages.” At the early congresses, German, French, and Italian were the major languages, and English was the exception. Nowadays, the reverse is true. As a matter of fact, English is used sometimes by participants who have difficulty even reading English. At a recent congress, a delegate from a non-English-speaking country read his paper. It took quite a time for the audience to realize that he was not reading the paper in his native language but in English. Incidentally, there was (as far as is known) never any simultaneous or consecutive translation. Actually, practically everybody understands spoken and broken English.

F. Non-Lecture Programs

1. Socials, General

As ICTAM/IUTAM really became a “meeting place” rather than a publication outlet, one might therefore assume (not knowing what happened) that nowadays more emphasis is placed on socials by the LOC’s than at the beginning. Actually, the situation is the reverse if the emphasis on socials is measured by number of nights without any social program. During the pre-WWII congresses, the number of “un-programmed” nights was one or two. After WWII, there were usually three or four nights without any socials or other programs, and the participants, or at least the bulk of the participants, were left on their own. There were, however, two post-WWII congresses, the socials of which were exemplary, both in numbers and also in the imagination of the local executive committees. One was the Istanbul congress, which was planned by E. Kerim. Below, we cite from the paper “Notes on the Eighth International Congress on Theoretical and Applied Mechanics, 1952 Istanbul, Turkey” by D. Drucker and E.H. Lee published in 1952 (see references).

The great friendliness and sincere interest displayed by the visiting members were, however, completely overshadowed by the truly remarkable hospitality of our Turkish hosts. It is impossible to think of anything additional they could have done in organizing the congress. There were truly impressive receptions by the Rector of the University of

Istanbul, by the Rector of Technical University of Istanbul, and by the Minister of Public Education. The banquet at the Municipal Casino combined fine food and entertainment. A Sunday boat trip on the Bosphorus enabled members to obtain the best views of the natural beauty of Istanbul and its surroundings. An evening of authentic folk dances and songs presented in an outdoor amphitheater gave the flavor of an older culture now replaced by a modern one. All these, and there were more, represented but a small part of the work of the Organizing Committee. Buses were always available for transporting members to places to which they wished to go; guides and information personnel were always ready to help. Our thoughtful hosts also left enough free time for individual sightseeing, shopping in the bazaar, visiting mosques and museums, and for all the other fascinating diversions afforded by the cosmopolitan city of Istanbul.

The other post-WWII congress, which is noted and recalled again and again, was the XII Congress held in 1968.

2. Topical Description of Past Socials

From the point of view of meeting other participants and seeing who is present, those socials that include mixers (whether alcoholic beverages are served or not) are the most beneficial. Such affairs are “early bird” parties, banquets, museum visits with receptions, etc. Boat excursions fall in the same category (at least four times during the congresses), and they were most popular. The personal touch in planning is the most important element and is more essential than the food served. At one congress the outgoing university president gave a beautiful garden party, although most of his furniture was already crated. Everyone felt that the hosts really cared.

In city tours, plant visits, and theaters, social contact is limited to speaking with a few participants. It appears that 15–25 % of the participants arrived with spouses and/or other family members. In general, these spouses were well taken care of during the days the participants had their technical sessions.

G. Exhibits

1. *Conversazione*

The “*Conversazione*” is an Italian word meaning “conversation” or “evening party.” It has been used to describe technical exhibitions, combined with refreshments in two ICTAM congresses in 1934 in Cambridge UK and, in 1938, in Cambridge USA. Details of the first one are not available. G. Batchelor mentioned that the Royal Society of England has used this mechanism and name for a considerable time.

Some details of the Cambridge (USA) *Conversazione* in 1938 are given in the appendix. Basically, it was an evening “session” in which a multitude of professors and some mechanics experts in the East Coast area demonstrated their experimental

setup in the MIT mechanical engineering department laboratories. The list included in the appendix reads like the Who’s Who in Mechanics in the middle of the century. Their topics make fascinating reading.

It seems that this mode of communication at IUTAM congresses did not continue. This was due not only to the eight-year time lapse between Cambridge and Paris, but, also, because it was impossible to repeat it in war-torn Paris in 1946. Actually, conversazione continued in two different ways, even if not at IUTAM. The “science fairs” are “comunicazioni” in much less sophisticated ways. Also, the poster sessions used nowadays worldwide have some relation to conversazione, though the latter is more discussion than equipment oriented.

2. Publisher Exhibits

Book and journal publishers had exhibits at most of the congresses since the IX Congress held in 1956. The number of publishers who exhibited were from the world’s leading ten or so technical and scientific publishers. Occasionally, book dealers exhibited as in Munich and also in Delft in 1976. All these exhibits were usually quite simple; frequently, even the publishers’ names were not displayed. The best and largest book exhibit was in Toronto where more than five book publishers exhibited. They were both from the US or from Europe, or publishers with operations on both continents. These exhibits showed books and also journals. Occasionally a handout list of the exhibited books was available, with the name, time, and location of the exhibit. It is clear that the publishers did not put much effort into “jazzing up” the exhibits at IUTAM as they have always done, e.g., at the Frankfurt International Bookfair, where the number of visitors is a few orders of magnitude higher.

3. Institutional Exhibits

Four institutional exhibits have been organized by Stephen Juhasz in cooperation with the Local Organizing Committee since 1952 as follows:

| Congress | | | Exhibit theme |
|----------|---------|------|-----------------------------|
| No. | City | Year | |
| XIII | Moscow | 1972 | Famous Mechanics Scientists |
| XIV | Delft | 1976 | From Delft to Delft |
| XV | Toronto | 1980 | Mechanics in Action |
| XVI | Lynby | 1984 | Short History of IUTAM |

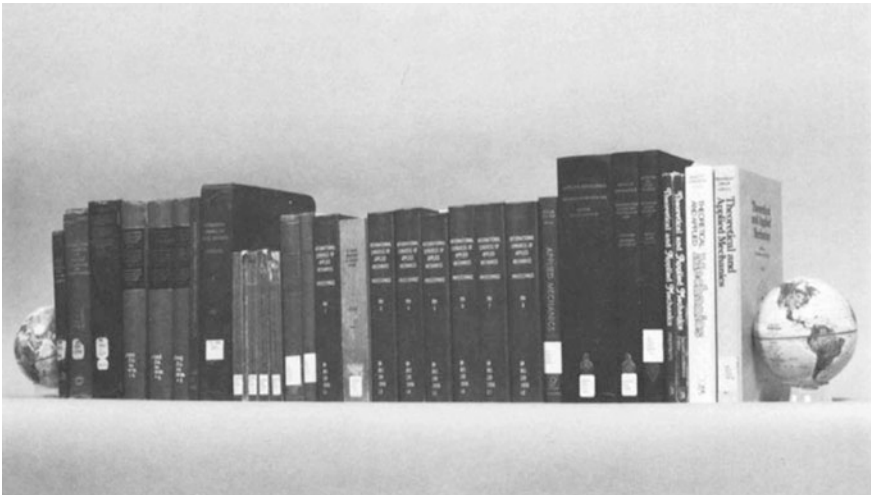
The first three of these were composed of a 10 m long and 4 m high “histowall” with an inclined table. The fourth was of similar design but 5 m long. Unfortunately these exhibits are not available anymore.

H. Proceedings

1. General

The ICTAM/IUTAM Congress Proceedings are the main permanent record of the congress activities. The organizers should be commended for the fact that all proceedings of the congresses, with the exception of the VI Congress, were published. The proceedings were published by commercial publishers and/or by universities where the congresses were held. The proceedings of the XXIII Congress in Beijing were the first ones only published electronically. They were available as ‘open access’ which means that everybody may download them from the internet and read them for free.

Nowhere in the world is there a place where all published proceedings are under one roof. Efforts were made by S. Juhasz to compile, temporarily, a full set up to the XV proceedings. For this, copies were borrowed from five other libraries. Published proceedings of the ICTAMs 1924–1980 were collected on loan from six countries while it was much easier to collect the proceedings of the ICTAMs 1984–2008. The proceedings of the ICTAM 2012 were only published electronically. The photos show pictures of the full set. The bibliographic details of the Innsbruck Conference and of all published proceedings are listed in the appendix.





2. Publication Modes

In general, the ICTAM/IUTAM undertakings were of a high standard. The quality of the proceedings is, however, uneven and incomplete. One can explain the situation. There was no permanent ICTAM headquarters, and even now the IUTAM secretariat changes locations. Furthermore, the publication of the congress proceedings is not the duty of the general secretary but of the local organizers.

Two charts in the appendices give details of the proceedings. The first lists the congresses with the number of pages, papers and the mode of publication (papers given fully or by abstract or listed only by title). The other chart analyzes in generic terms the published proceedings.

3. Tables of Contents

Although the tables of contents are part of the proceedings, they are discussed here briefly because of their importance.

One of the congress proceedings had no table of contents, and only the names of the general lecturers were given, without the titles of their papers. In the same proceedings, the contributed papers were given by abstract, and several hundred pages had to be scanned to see what the volume contained. In other proceedings, the

locations of the tables of contents varied, also, and so did the sequencing of papers and the elements in the tables of contents. Some proceedings had the table of contents divided; the keynote, general, and sectional papers were listed at the beginning, and the list of contributed papers at the end.

I. Accomplishments

1. Advancement of the Art

After discussing with a multitude of mechanics the accomplishments of ICTAM/IUTAM—or more specifically how it advanced the art—one gets the definite feeling that the activities in 1922 and 1924 were the beginning of a blossoming of applied mechanics not unlike the Renaissance in arts and letters of the 15th and 16th Centuries.

J. Lighthills contribution at the beginning of this volume indicates the view from a perspective of 60-plus years. To show the same from a perspective of 14 years after the start, we reproduce below a 1938 statement by K. Compton, physicist and former President of MIT. This was part of his opening address at the Vth IUTAM Congress held in Cambridge USA.

An intelligent person who is not particularly acquainted with the field of applied mechanics might well ask the questions: ‘Why would there be this worldwide interest in applied mechanics? Surely mechanics is the oldest branch of pure and applied science, and its principles have been well established for many, many years. Did not Archimedes discover the principles of statics and hydrostatics and Galileo the laws of motion; and did not Isaac Newton formulate the basic principles of dynamics? Was it not Lagrange who, in his famous equation, stated the laws of mechanics in a generalized, yet usable form? With the establishment of these fundamental laws, refined for certain purposes by the principles of least action, and Hamilton’s principle, and with the mechanical theory of heat well-established in those principles of thermodynamics which were developed a generation or two ago, what is there left to attract the serious attention of an international body like this?’

Compton continues:

To answer these questions, there is a vast difference between the establishment of a fundamental principle and its application to specific problems, for the principle may be simple and the application very difficult. From my own field of physics, there is an interesting example of this difference. About a decade ago, there was great activity among theoretical physicists in developing the principles of quantum mechanics, having to do with the application of mechanics to atomic structure and radiation. In reporting one of the most brilliant developments of this subject, the able young physicist who was responsible for it wrote in the opening paragraph of his paper as follows: ‘Now that the quantum mechanics has given us the explanation of all of chemistry and most of physics, etc., etc.’ Yet, as a matter of fact, this development of quantum mechanics has been applied precisely only to hydrogen, of all the chemical elements, and to no molecule and to no matter in bulk. The reason is that the application becomes so complicated in systems more complex than the hydrogen atom that, at best, only approximations to the theory can be made.

E.H. Lee now comments on an expanded role of mechanics in the area of constitutive theory which forms an adjunct to the “basic laws”:

It seems to me that an important part of the development of Applied Mechanics has been concerned with the formulation of constitutive relations to express force-deformation properties of materials, i.e., the basis for valid stress and deformation analysis beyond the yield (plasticity), plastics (polymer fluids and solids), rubber elasticity and even heavy gases. This supplies the basic physical information for nonlinear finite deformation continuum mechanics. Such questions play a role in current research and fall outside *applying the fundamental principles of mechanics*.

2. Building Contacts Between Participants

At the earlier congresses, as has been stated, the number of participants was low and most people knew each other or knew about each other through their publications. The situation changed continuously. Eventually, more people met at a meeting who never heard from each other and who, (as turned out occasionally during the discussion of a contributed paper) were going through the same agony in trying to solve identical problems, but were using entirely different approaches. These contacts led to successful life-long correspondence, mutual visits, and friendships.

Another type of personal contact can occur between a young graduate student and the “great mechanician.” A now internationally recognized Stanford mechanician was in Istanbul. He said that although he had not formally met J. von Neumann, he shared the same handle on the crowded street car. Another interesting story on personal contact is mentioned in the preface of an early congress. The participant, seeing the name tag of Professor Milne-Thomson exclaimed, “I knew your writing well, but always believed that you are two persons.”

3. International Aspects

We should consider not only person-to-person relations but also the nation-versus-IUTAM ones and vice versa. It is felt that one of the great accomplishments of the applied mechanics congresses was to build bridges. Until to the 40's, the bridges to be built were between scientists from Central Powers and the Allies. After WWII, the bridges to be built were between mechanicians of the Allies and the defeated Axis powers and later between the scientists of East and West.

ICTAM/IUTAM was fabulously successful in all three periods. Many friendships were formed after sitting across the table at a banquet or sitting side by side on the excursion bus. One of the participants in Munich described that academician L. Sedov embraced S. Timoshenko, whom he had seen for the first time after many decades. A member of the General Assembly, then a graduate student, was running after an IUTAM bus in Istanbul. At the lecture he found out the other “graduate student” who

did the same was the young professor, M.J. Lighthill. Another interesting East-West cooperative was the large “Famous Mechanics Scientist Exhibit,” which was jointly executed by a critical review journal in the U.S. and its USSR counterpart, the Referativnyi Zhurnal Mekhanika with the cooperation of G. Mikhailov of the Lomonosov University. G. Mikhailov was also the chairman of the local organizing committee of the XIII Congress in Moscow. At a social during the Zurich congress, one of history’s great mathematics mechanician, Euler, was celebrated as a person who obtained his education in Switzerland and performed much of his scientific work in the USSR and other foreign countries.

There was considerable mixing between delegates of all socialist country participants and other participants. One participant of the Toronto Congress (1980) commented that there were even cordial exchanges between the Russian delegates and recent emigrants from the USSR.

What was really accomplished was the creation of an “International Corps of Mechanicians,” which, while somewhat of the nature of an “Invisible College,” becomes visible every fourth year.

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