



Moshé Flato – Personal Recollections

THE passing of Moshé Flato at the unreasonably early age of 61 leaves an unexpected and large hole in the community of mathematical physicists. Everyone who had the occasion to meet Moshé came away with the feeling that here was an exceptional individual. Outspoken as he was, with regard to both science and people, he was sometimes blunt, but we always appreciated his forthrightness and benefited from his insights. His personal relations were characterized by truly exceptional generosity and warmth. Dinner with Moshé, Daniel Sternheimer and their friends was invariably an unforgettable mix of culinary and intellectual adventure.

Moshé was a great communicator. One of several telephones in his apartment was always ringing, and Moshé talked in English, French, Polish, Russian, Hebrew, Arabic, and smatterings of Swedish and Japanese. A master of imitation, he had a knack for capturing the essence of a language and its speakers and could make you believe that he spoke a language fluently by making just the right sounds and gestures. His linguistic skills and his ability to reach out to people made him many friends throughout the world.

His energy and dynamism were legendary. Apart from creating his group at Dijon, and authoring many papers, he was able to use the force of his personality to create two things for our community, which are hoped and expected to live long into the future and be monuments to him. One of these was the journal *Letters in Mathematical Physics*, which filled a very definite need. As one of the co-editors for over thirteen years, Elliott is happy to have contributed a bit to the enterprise, but the largest contribution, by far, was Moshé's.

The second contribution (with Daniel) was the invention of the idea of a mathematical physics association. Although at first its scope was only Europe, it eventually emerged as the International Association of Mathematical Physics, which has survived for a quarter of a century and undoubtedly will continue well into the future. It remains one of the few international scientific organizations whose members are individual scientists and not delegations.

We shall remember his many unique contributions and miss him very much.

Elliott Lieb and Christiane Fellbaum, Princeton, February 1999.

(Elliott Lieb was an Editor of *LMP* from 1984 to 1997)

WE cannot point precisely to how and when our friendship with Moshé and Daniel started. We had met them and Moshé's sister Irit (then a teenager) in Varenna in the mid-sixties and at numerous meetings after that. The foundation of the International Association of Mathematical Physics, initiated by Moshé, presented additional occasions to interact more personally in the seventies.

The first visit to Japan by Moshé, Daniel and Jacques was in the summer of 1976. Our records show a short stay by them at RIMS (Kyoto) in February 1979, followed by Huzihiro's visits to Dijon in April – May 1979 and June – July 1980. Their first longer stay at RIMS was in October – November 1983. During that time they lived on the fourth floor of the house of Dr Sato, an otolaryngologist, near Ginkakuji at the north east corner of the intersection of Shirakawa and Imadegawa. After that Moshé and Daniel became frequent visitors.

As soon as we became closer to Moshé, we were much impressed by a number of his strong characteristics which we had not seen in other people before.

Although Moshé did not seem to have studied any Japanese before, he easily picked up many Japanese words and then used them very skillfully. These words were mainly short ones, which carry typical Japanese feelings, concepts, or responses, and frequently used as key words in everyday conversation. Moshé used a couple of these words to make a perfect communication with his Japanese friends, often causing much laughter. This ability may be partly related to his love of music, which enabled him to deal with a language as a piece of music. It may also be related to his sharp mind, always sensitive to the essence of any matter, scientific or mundane.

As every friend of Moshé knows, he loved good cuisine. In Japan, he loved Japanese *Kaiseki* (which is seen as the origin of the *nouvelle cuisine* in France) and *sushi*. His stay at Dr Sato's house led him to the newly opened nearby *sushi* place of chef Hashimoto and his wife, with whom Moshé and Daniel developed a very warm friendship. Alone or with friends (such as us), they made uncountable visits to Hashimoto's *sushi* place for dinner, followed by dessert at a nearby coffee and cake house, partaking of tasty cakes or icecream and coffee or espresso. This tradition continued even when they stayed some distance from Ginkakuji during their later visits to Kyoto.

Moshé's love of (good) *sushi* is such that whenever they had a chance to pass through Tokyo, Moshé and Daniel would stay at a hotel in the Ginza area, have a *sushi* dinner at Edo Gin in Tsukiji and enjoy *Kabuki* during the day (in addition to scientific discussions with Omori and Maeda's research group in the Tokyo area).

Among various traditional arts and performances in Japan, Moshé seemed to love best *Kabuki* plays and *Ukiyo-e* (woodblock prints) by Utamaro. It seems to us that the voice and performance style of *Kabuki* actors, especially when they posturize, and Utamaro's way of depicting ladies in *Ukiyo-e* have some resemblance to the way that Moshé evaluated and discussed science, sometimes strongly criticizing prominent scientists and sometimes praising talented younger scientists.

In December 1988, during Moshé's first long stay at our house in Iwakura, an unfortunate accident happened: Moshé slipped on a wet floor inside the house in front of the toilet and bathroom; his right foot got caught in a small step and he fell on it, resulting in a trimalleolar fracture of his right leg plus a sprained ankle. The doctor who saw him shortly afterwards qualified this situation *ichiban* (number one) and put his leg in a temporary splint. This did not prevent Moshé from spending six hours the next day at Kyoto's Minami-za watching *Kabuki!* There was some difficulty during the subsequent period in hospital, but fortunately we arranged that Moshé be treated by an orthopaedist whom he could rely on and who performed a successful operation. Eventually Moshé invited the doctor and his wife (with the two of us and Daniel) to a French restaurant in Kyoto to celebrate his recovery.

In the Spring of 1989, Anna (Moshé's mother) visited Japan. While she was crossing a major intersection with Irit in downtown Kyoto (going to Takashimaya), she slipped and partly fractured a bone. She had to be hospitalized. Fortunately this incident was not too serious, despite her age and she was soon able to leave the hospital, even visiting Heian shrine in a wheelchair pushed by Chieko.

We must add one more anecdote about Moshé. During a more recent visit to RIMS, I introduced one of my graduate students to him. As soon as I mentioned his family name, Moshé instantly recognized and remembered his name, which is Hamachi. Until that instance, I had never associated this name (which is not uncommon) with the fish of the same name, because they are written in a completely different way in Japanese and, of course, belong to completely different categories. However, Moshé instantly recognized the name of this student as the name of his favorite *sushi* fish (yellowtail tuna). In fact, Mr. Hamachi wrote his M.S. degree thesis at RIMS on a problem (in deformation theory) suggested and directed by Moshé.

Huzihiro is happy to acknowledge Moshé's scientific influence which resulted in a number of publications, including one joint paper, and Moshé's help in the matter of journal editing. The two of us are grateful to Moshé for his kindness towards our sons, especially Isato to whom Moshé was like an uncle. We miss Moshé very much.

Chieko and Huzihiro Araki, Kyoto, February 1999.

WE knew Moshé for a very long time. Ludwig met him and Daniel in 1966 in Moscow during ICM-66. Then, in the fall of the same year, he met them again in France, where he spent two months at IHES in Bures-sur-Yvette. So our acquaintance, which in time grew into a close friendship, covers exactly half of Ludwig's life. In 1966 we were all much younger and Moshé and Daniel introduced Ludwig to some mild temptations of Parisian life. Ania met Moshé much later when she was allowed to accompany Ludwig abroad at the end of the seventies. During our visits to Paris, we were able to live in the cosy studio on rue Rollin, which so many of Moshé's friends also used. Thus Paris is for us associated primarily with Quartier Latin sites. During all these visits we were surrounded by the generous hospitality of Moshé and Daniel.

A most memorable example is an excursion to Normandie in the beginning of the eighties and lunch in Rouen at an old restaurant located in the main square just across from the site of Jeanne d'Arc's auto-da-fe. Looking through the wine list, Daniel spotted a very rare and exquisite Romanée-Conti 1957 (it was also expensive, but Daniel considered it a bargain by the quality/price ratio). Moshé immediately ordered a bottle (one of their last three bottles). We were quite informally dressed and so the owner was summoned by the waiter to look at us. He seemed to be rather suspicious, but Moshé was imposing and under stares of local bourgeois in black suits (it was Sunday), we were served the wine in a silver decanter and finished it with a very tasty plate of duck (*canard au sang*). After the lunch, Moshé visited the Deauville casino and returned in a very good mood. He claimed that his gain easily covered the price of the lunch, including the wine.

We met twice during 1998. In May – June, Moshé and Daniel visited St Petersburg, attending the conference dedicated to the centenary of V. A. Fock. We made a trip along the coast of the Finnish Bay to our country house in a Jeep, which we were able to buy at the beginning of the nineties. It was mostly paid for by the money from the UAP Prize, established by Moshé and Yvette Chassagne and given to Ludwig in 1988 by the Prize Committee, headed by André Lichnerowicz – who passed away two weeks after Moshé in the same hospital and from the same cause, attended by the same doctor (André's son Jérôme). We could not help feeling that Moshé looked somehow tired and not so energetic. However, when Ludwig and Moshé met once more in Berlin in August during ICM-98, Moshé was very much his usual self and nothing indicated that this meeting would be the last. Is it not symbolic, that the very first and the very last meetings of Moshé and Ludwig occurred during ICM?

Moshé and Ludwig had many joint scientific interests in modern mathematical physics, dealing primarily with quantum theory. A major common problem was that of the nature of quantization. In particular, the idea that the notion of deformation is most adequate was a leading one in their discussions. Ludwig learned a lot in this direction from Moshé, Daniel and also from André Lichnerowicz. Another example (still to be pursued) of the depth of Moshé's intuition is shown by the recent fashion in using AdS space, singletons and conformal invariance in new approaches to QFT.

Moshé and Daniel, together with Chris Frønsdal, worked on the topic long before this surge of interest in it.

Moshé's role as an organizer of science cannot be overestimated. His chair in Dijon required lot of attention and energy. He was a leading figure in the organization of IAMP. And LMP, which is his creature, became a very popular 'meeting place' for many people, devoted to modern mathematical physics. In his esteem for other scientists, Moshé paid at least as much attention to their human qualities as to their scientific achievements – and no attention whatsoever to their importance in the community. This made him a controversial figure to some of them. But we, especially Ania, appreciated this attitude very much. Our relations with Moshé were always very close and cordial.

Besides science, Moshé had lot of interests in life. His apartment on rue de Tournon is full of works of art, including paintings by artist friends. It was very interesting to discuss music with him. He personally knew many famous musicians, including Barenboim with whom he had a common piano teacher (Barenboim's mother).

The new political situation in Russia during the last decade changed the course of life of many Russian scientists. Moshé took a very constructive and friendly attitude, helping many of them and, in particular, Ludwig's former students. Leon Takhtajan, Kolya Reshetikhin, Petya Kulish, Misha Semenov-Tian-Shansky, Fedya Smirnov and Sasha Volkov got very strong support from him and became his personal friends. We are especially grateful to him for his interest in the Volkov family and our daughter Masha. Our grandchildren were really fond of Moshé during their stay in Dijon in the middle nineties. We found that family values were very important to Moshé. It became especially clear when we met his mother (Ania shares the same name with her) in Moshé's apartment at the rue de Tournon. In spite of her age, she looked very pretty and elegant and in speaking with her (in Russian of course), Ania did not feel any difference in age. The mutual attachment of mother and son to each other was quite evident.

When we remember Moshé now, our natural sorrow is combined with warm feelings. Men like him play a very important rôle in consolidating relations between people. The world would be a much better place if there existed more humans like him.

Ania and Ludwig Faddeev, St. Petersburg, February 1999.

OUR friendship with Moshé and Daniel goes back to Chris's participation in a meeting near Paris in 1966. It was characteristic of Moshé that he was the one to initiate contact. Hints of Moshé's attitude to physics and to people appeared at once. To physics he applied unusual mathematical rigour. Measured by reputation, his major achievements were in mathematics, but his mathematics was always directed towards physical problems and all of Moshé's work was driven by his vocation for physics. He was sometimes critical towards people, but he will be remembered, above all, for his unequalled generosity. Moshé always put personal considerations first and judged people by their moral character first and by their accomplishments second.

Some of our meetings with Moshé took place in Trieste, for Abdus Salam always gave Moshé a very warm welcome there. He once appeared accompanied by his beautiful young sister, Irit, of whom he was extremely proud and protective. Later she married a man whom we all came to appreciate. Moshé was very close to his family. Because of our frequent visits to Paris, we came to know his mother Anna as well as other friends and relatives from Tel Aviv, all of whom appeared in Paris from time to time. But Moshé's visits to Tel Aviv were much more frequent.

Visiting Moshé in Paris and in Dijon was a great experience. Moshé's responsibilities in Dijon were awesome. During lectures given by his guests he was frequently called away for long periods, but this never prevented him from wading right in the moment he returned. And then there would be the dinners! We are both rather modest eaters, and a bit frugal as well, but always as Moshé's guests we were treated to the most sumptuous, high class French meals. Moshé and Daniel always treated us as most favored guests whenever we were in France, and many people will nod in recognition when we allude to their unlimited generosity both in France and abroad. There was only one way to reciprocate: in order to gain the privilege of occasionally getting the check, it was necessary to insist, in advance, on getting them to accept the invitation.

Among the best meals that we shared were the ones we enjoyed in the apartment in rue de Tournon. These were sometimes prepared expertly by Jeannine, who claimed to have learned everything from Moshé. We never learned at first hand whether Moshé knew anything about cooking. Once Daniel was cooking and Moshé was called into the kitchen to do the 'essential part', adding the wine and the spices to the sauce. It was an impressive performance, and after Moshé returned to the living room, we asked Daniel what his system was. Daniel's answer: Completely random! Our favorite dinners with them were at home, *en famille*: just the four of us, and, when possible, Jacques and Ratsami.

Moshé's generosity was legendary. Since we do not want to mention any instance that involves recognizable individuals (though such cases would do much more to bring out Moshé's character and moral values) we will just say that Moshé never passed a beggar in the street without giving. From now on, we too will give, in Moshé's name. This is one of the many incidents that will bring Moshé to mind in years to come.

In 1988-89, thanks to our mutual friend Huzihiro Araki, we were fortunate to be able to spend about six months together in Kyoto. This visit was enhanced by a brief visit by Moshé's mother, Anna, but it was marred by an accident. Moshé slipped on a wet floor and suffered a bad break in his right leg. It may almost be said that Moshé reverted to childhood. He very much resented his helplessness and it is probable that his shouts at Daniel rose by several decibels. The doctors insisted on chest X-rays, and Moshé only gave in through absolute necessity, after a long struggle. He was afraid that his pictures would show advanced effects of smoking on his lungs. They showed nothing at all and we all expected that this reprieve, along with abstinence from smoking during a week in the hospital, would induce Moshé to stop. Unfortunately, this did not happen. Another result of the hospitalization was the discovery of high blood pressure. Moshé refused to take any medicine, or to monitor his blood pressure. Moshé never wanted to make any adjustments though he was always very solicitous about others, and urged his friends to take care of their health; everyone but himself.

Everyone is aware of the generation gap, but for Moshé it did not exist. He approached everyone, of any age, with the same genuine interest and became intimate, to an amazing degree, with octogenarians (perhaps not so surprising) and with teenagers (much more so). We will not give examples, but only say that we found this aspect of Moshé's personality particularly impressive. It is remarkable that so many young people looked at Moshé as their spiritual father; at his funeral we met several of them.

Finally, we must acknowledge, on behalf of ourselves and UCLA (and, in particular, Moshé's very close friends, Bob Finkelstein, V. S. Varadarajan, and Gilda Reyes) the very positive influence that Moshé has had here. His frequent visits, including several quarters of teaching, have been high points of our social and professional lives. When we were on different continents the phone brought us close – and Moshé used the phone more than anybody else that we know. Chris could always tell, when Amelita picked up the phone at home, if it was Moshé calling, by the peals of laughter that would begin to fill the apartment. We have lost a truly wonderful friend.

Amelita and Chris Frønsdal, Pacific Palisades, CA, January 1999.

MOSHÉ and I first met, very briefly, at a conference on representation theory and mathematical physics in Liège, in the summer of 1977. He arrived midway through the conference, just in time for his talk, making a dramatic entrance: he wore a burgundy colored shirt whose back was embroidered with a huge, resplendent bird, wings outstretched. Moshé and I exchanged only a few words before my departure the next day.

The following spring Moshé invited me to his ‘laboratoire de mathématique physique’ in Dijon. Over the years, my visits to Dijon became regular, and they proceeded according to a regular pattern. Moshé and Daniel Sternheimer met the visitors – often two or three, sometimes accompanied by spouses – in Paris, at the gare de Lyon. After espresso at the bar in the station, the group would rush to the train. One or two of Moshé’s colleagues and students met us at the railroad station in Dijon. Then to the department, with a brief stop at our hotel along the way. The visitors lectured in the late afternoon, some the next day. In the evening, Moshé presided over a dinner for the visitors and members of his department. Conversation would not cease in Moshé’s presence, driven along by his strong convictions about mathematics and mathematicians, politics, and all aspects of life.

What had begun for me as a mathematical acquaintance developed into a personal friendship, and beyond: I felt more and more as part of Moshé’s family, staying regularly at his home, having him stay with me when he visited the Boston area, and meeting him in other corners of the world. My wife became part of the family, as did my daughter when she was born seven years ago. Moshé consciously used the word ‘family’ to describe our relationship. This was an extended family – family acquired through shared scientific interests – but the size of the group in no way diminished the intensity of the bond he had with each one of us.

Moshé exhibited many personal qualities to an extreme. He was exuberant, always full of energy, trying to fit as much into every minute as possible, even to the point of impatience. The most generous person I know, he was generous towards friends and strangers alike – I never saw him ignore an outstretched hand. His political engagement opened some connections to those in power, but he preferred to stay on the sidelines, as a critical, opinionated observer. Moshé had highly refined tastes, especially in his enjoyment of food, music and art, and he liked to share this enjoyment with his friends.

Not surprisingly, Moshé’s scientific persona reflects the power of his personality. With his energy and wide-ranging interests, he completely dominated his department – not in the least as a tyrant, but as someone to whom influence flows through the strength of his ideas. The journal in which these recollections appear became his instrument by default, not because he strove to make it that; indeed, he sought out as co-editors others who might be presumed to be able to stand up to him, if necessary. In scientific politics, too, influence just came to him. Influence, paired with strongly held convictions, got him into a number of fights, though always on the side of the angels, it seemed to me.

Moshé had broad tastes in mathematics. At times, the ‘laboratoire de mathématique physique’ was home to a number theorist and others equally far removed from physics. Among the visitors to the department, mathematical physicists predominated, of course, but differential geometers, number theorists, and representation theorists were also frequent guests. The areas in which Moshé made direct contributions ranged from representation theory to deformation quantization and partial differential equations, usually long before the subjects had become fashionable. The thesis topics of his numerous students span the same broad range.

Moshé seemed larger than life. Departed well before his time, he will be missed by many, greatly.

Wilfried Schmid, Harvard, March 1999.

THE first time I met Moshé Flato was in the Spring of 1966 in Trieste. At that time my husband Ryszard Rączka was a long-term visitor at the International Centre for Theoretical Physics and I was accompanying him with our three children. I remember our first meeting with Moshé very well – he oozed with energy, and it was immediately clear, that he had a very strong personality. Ryszard was then an informal leader of a group of physicists at ICTP, and during his stay in Trieste he became acquainted with many of the leading scientists of that time. However, his contacts with Moshé evolved into a very close, lifelong friendship. Moshé became also a very close friend of myself and my whole family.

What brought Ryszard and Moshé together was a quest for mathematical rigour and elegance in the considerations of theoretical physics, and a strong interest in the fundamental problems of quantum field theory. These were very interesting times in physics and mathematics, and Moshé and Ryszard were very excited about the emerging scientific ideas. Ryszard was deeply convinced that exploiting symmetries and putting many concepts from the quantum theory on a more sound mathematical basis would greatly facilitate the discovery of new physical theories. Not all of the theorists accepted this point of view. In Moshé, Ryszard found someone who shared these convictions to a much greater extent than anyone else he knew. Moshé gave Ryszard a lot of support for his research and only I know how important this was for Ryszard. The contacts with Moshé certainly had a great impact on the development of Ryszard's scientific career.

Already in the early stage of their friendship emerged the idea that research in the domain of mathematical physics should be promoted through a scientific society, a scientific journal dedicated to rapid dissemination of the new results, and a book series. Quite amazingly, all three ideas have materialized. In particular, the International Association of Mathematical Physics was founded shortly after a conference on mathematical physics held in Warsaw in 1974, and in 1975 the journal *Letters in Mathematical Physics* was started, with Moshé and Ryszard as the first editors.

Ryszard visited Moshé in Paris and Dijon many times and on several occasions Moshé visited Poland. It is worth noting that he was linked to Poland by family ties. Before moving to Israel – where Moshé was born – his family lived in Łódź, and his father graduated from the technical university in Gdańsk (which in those days was the Dantzig technische Hochschule). Moshé's father spoke Polish fluently. Moshé understood Polish quite well and in conversations with his Polish friends he used to switch to Polish from time to time, thus creating a unique atmosphere of comradeship.

During his stays in Poland, Moshé always visited us at home and he was always a most welcome guest. Discussions with Moshé were very stimulating – he had a great sense of humour, and he didn't hesitate to express strong opinions on many subjects, not the least politics. Moshé knew all my children and I could talk with him about each of them like with a very close relative. Moshé remembered very well many facts from their lives and had a lot of warmth for each of them. I also felt his great understanding for my rôle as a wife of a scientist and a mother with a large family.

Moshé's relations with my family were a manifestation of a more general trait of his character which I always admired – his great sensitivity to other people. He remembered very well the people he had met only once, and he was interested in their lives. Moshé had a lot of understanding for the difficulties experienced by his friends, and he reacted with great spontaneity and compassion to the various – sometimes dramatic – experiences of the people he knew. He never hesitated to help someone in need.

I am enormously grateful to Moshé for what he has done for me and my family after the death of Ryszard – for his special visit to Poland to comfort us right after the death of my husband, and for his commitment to the organization of two conferences held in Poland, which honoured the memory of Ryszard.

We would always miss our great friend Moshé Flato.

*Aleksandra Raćzka with Piotr, Anna, Urszula, Magdalena and Jan,
Warsaw, March 1999.*

WHEN I was told by Daniel Sternheimer that Professor Flato, our dear Moshé, had died I was deeply touched. I experienced a very overwhelming feeling of utter powerlessness, inanity of our life and a painful void. Why was it so? The departed Moshé Flato was not only a first-class mathematical physicist with a rare capability of revealing the nub of the problem, a brilliant, uncompromising discussant with a deep knowledge of modern mathematics, but also a man who was ready to fight any injustice, a man who always showed great compassion to anybody's difficulties; in short, a man who became my close friend in a real sense.

I met Moshé Flato in 1965 for the first time at what is now called the Abdus Salam International Centre for Theoretical Physics, then located at Piazza Oberdan in Trieste. It was a crossroad for outstanding theoretical physicists from the East, West, North and South and a place closely related to the development of several important approaches in modern physics whose common denominator was symmetry on which Moshé Flato was a real expert. There started my unforgettable discussions with him on many contemporary problems in mathematical and particle physics. We particularly discussed the issues of the representation theory of Lie groups and Lie algebras, twistor theory, conformal field theory, gauge theories of gravity, deformation theory, quantisation, etc. I admired his numerous pioneering research results (in particular results in deformation theory, in the theory of nonlinear equations and in anti-De Sitter field theory) which were usually recognized later since they surpassed common approaches used at the time.

I am grateful to him for various things, for instance for helping me to penetrate through the Iron Curtain in the 1970s, namely to spend my unforgettable sabbatical period in Collège de France. (In fact, I was invited as a visiting professor for a sabbatical year but I succeeded in being in France for only three months with a one-year delay and then only thanks to the direct intervention of President V. Giscard d'Estaing.)

In order to describe the great personality of Moshé Flato thoroughly I should add four things. First, he was a gourmet and grandiose host. With Daniel Sternheimer he gave many dinners for me and other colleagues and all left indelible impressions. Second, he did not like snobs. I remember the following story: one morning he came to a well-known university and asked one professor there what he was interested in physics at that moment. Receiving the answer: "I am solving the theory of everything", Moshé promptly reacted in his typical way: "And what will you be doing in the afternoon?" The third story shows his good sense of humour. We were sitting around the table talking about London. Moshé finally remarked that London is not a bad town since, thanks to the new tunnel, you can always go and have a dinner in Paris. Fourth typical thing of Moshé was that he was always surrounded by students. It was not only at conferences held in France but also at conferences abroad, e.g. in the Czech Republic, in which he often participated. Students admired his profound knowledge of discussed scientific topics but also his experience with Western and Eastern civilizations and many language skills.

We had numerous mutual friends and collaborators. They sometimes had different interests in research and other activities but they had one thing in common – they respected the hierarchy of values where science and scientific reasoning were on the top. In a few words – birds of a feather flock together.

The community of mathematical physicists appreciates very much two things associated with his name: the foundation of *Letters in Mathematical Physics* – a first-class journal which he was a spirit of, and the International Association for Mathematical Physics.

Personally, I am grateful for the opportunity to be a friend of Moshé Flato, this very exceptional, sensitive personality ardently searching for truth in real life and, particularly, in science, which we shall miss very much.

Jiří Niederle, Prague, February 1999.

MOSHÉ FLATO nous a quittés brusquement le 27 novembre dernier. Son caractère entier, sa forte personnalité et son exubérance laissaient difficilement son entourage indifférent. Si elles lui ont valu quelques inimitiés notoires, ces qualités lui ont surtout attiré un grand nombre d'amitiés vraies, dont les auteurs de cette note ne représentent qu'un tout petit échantillon.

Il avait reçu à Jérusalem une double formation de physicien et de mathématicien. Après des premiers travaux sur les applications de la théorie des groupes en physique théorique il s'est tourné vers les mathématiques, mais ses articles restent majoritairement publiés dans des revues de physique mathématique ou théorique. Il avait une très large connaissance des mathématiques et de la physique, et beaucoup d'idées, que son caractère ouvert et même extraverti lui faisait propager très vite dans la communauté, et il a été le créateur et l'animateur principal du laboratoire de Physique Mathématique de l'Université de Bourgogne, et surtout cette revue (LMP). Un bref coup d'œil à sa bibliographie donnera une petite idée du grand nombre de ses collaborateurs et interlocuteurs.

Les premiers travaux mathématiques de Moshé Flato ont surtout porté sur la théorie des groupes et plus précisément sur l'étude des représentations (de dimension infinie) des groupes de Lie, qui interviennent dans la physique quantique et des hautes énergies. L'une des difficultés rencontrées à cette époque était l'intégration d'une représentation de l'algèbre de Lie en une représentation du groupe. Il y apporta une contribution significative, notamment un critère d'intégrabilité.

Dès 1975, en particulier dans des notes avec D. Sternheimer et A. Lichnerowicz, il s'est intéressé aux "déformations ou quantifications de structures symplectiques" (les "star-produits"), question sur laquelle il a depuis travaillé longuement et inspiré de nombreuses autres études. Les deux grands articles de 1978 dans Annals of Physics sont une très bonne présentation du sujet et des problèmes qui se posent, et ont beaucoup contribué à les faire connaître*. Le problème d'existence d'un star produit fut résolu plus tard (en 1983 dans LMP) dans le cas "semi-classique symplectique". Une preuve plus géométrique est due à Fedosov, avec une classification en termes de déformations de la structure de Poisson que l'on retrouve dans le magistral travail de Kontsevich. Une contribution particulièrement intéressante est l'article avec A. Connes et D. Sternheimer dans LMP en 1992, où sont étudiées les traces sur ces star-algèbres et indiqués les liens avec les théorèmes de l'indice et la géométrie non commutative.

M. Flato a fait plusieurs autres travaux touchant aux représentations et à la physique, dans ce cadre des déformations, qui reflétait bien pour lui la relation entre une théorie

* Note de LBdM - Il est piquant que, bien que ma théorie des opérateurs de Toeplitz de 1979 rentre presque dans le même cadre, nous n'avions clairement perçu le lien que beaucoup plus tard. En fait je ne connaissais alors des star-produits que ce que m'en avait dit J.Vey : qu'il s'agissait de calculs horribles pour construire des algèbres associatives à grands coups de cochaînes, et que je serais bien avisé de ne pas regarder cela de près ; je n'avais sur le moment pas du tout vu qu'il s'agissait identiquement du même formalisme que celui des opérateurs pseudo-différentiels.

physique (p.ex. classique) et ses extensions (quantique ou autre). Il a aussi écrit plusieurs articles sur des EDP qui touchent directement à la physique : équations de Yang-Mills, Navier-Stokes, Maxwell-Dirac. Il s'est d'abord intéressé à des aspects formels de ces équations, ce qui a souvent eu pour effet d'irriter certains mathématiciens spécialistes des EDP, montrant par exemple qu'après un changement de coordonnées, formel ou dans un espace fonctionnel convenable suggéré par les symétries sous-jacentes, le problème est linéarisable ou complètement intégrable, etc. Cela n'est pas toujours la fin du problème, mais c'est évidemment une des premières choses à regarder, d'autant plus que c'est non trivial. En tout cas ces articles sont aussi une source d'inspiration, tant pour les mathématiques que pour la physique théorique.

A son arrivée en France, dans les années 60, le milieu des jeunes scientifiques français est dominé par les normaliens de la rue d'Ulm, milieu policé, structuré par des hiérarchies établies dès l'entrée à l'École et dont l'avenir montrera quelquefois la fragilité. Le tempérament explosif de Moshé Flato, son indépendance d'esprit, son franc-parler, son peu de respect des conventions sociales, lui ont alors valu quelques déboires, notamment avec la communauté des physiciens. Jusqu'à la fin il suscitera des réactions contradictoires.

Il n'avait pas toujours raison, tant s'en faut, mais jamais tout à fait tort non plus et ceux qui ont fait l'effort de dépasser le caractère abrupt, excessif, de certains propos se sont aperçus (quelquefois rétrospectivement!) de l'intelligence et de la finesse de bien de ses analyses. Peu sensible aux modes et difficilement influençable, il savait à merveille démonter les alibis scientifiques et mettre à nu le caractère politique de telle ou telle position.

Voyageur infatiguable, il avait beaucoup d'amis, dans le monde entier et bien au-delà des milieux scientifiques. Avec eux il s'est toujours montré d'une générosité sans limites, ne demandant rien en retour.

Personnage inclassable de son vivant il serait bien présomptueux de vouloir aujourd'hui figer son image.

*Louis Boutet de Monvel, Olivier Mathieu et Gérard Schiffmann,
Paris et Strasbourg, Février 1999.*

«**ULLÔ**, c'est Moshé !» Quand on entendait cela, pas question de répondre sur un ton neutre, un peu compassé ou trop bien élevé : «Comment allez vous, cher ami?» On commençait par un grand éclat de rire et on avait l'impression d'avoir un regain d'énergie. Jamais on n'était déçu par l'entretien ; il se passait quelque chose et on en ressortait plein de vitalité. On venait de faire une cure express de vitamines hautement dosées. En direct, c'étaient ses yeux qui impressionnaient le plus ; des yeux “à l'écoute” qui entendaient même ce qu'on ne disait pas, si vivants, si présents.

Moshé le chaleureux, Moshé le généreux recevait beaucoup. Des soirées plus qu'animées au cours desquelles certains arts tombés en désuétude étaient encore pratiqués. L'art du choix par exemple. Moshé savait choisir ses vins, ses mets, ses amis et ses fromages. Ne parlons pas des sujets de conversation. Je me suis parfois demandé s'il existait des questions qui ne le passionnaient pas, dans lesquelles il ne s'engageait pas avec vigueur, sur lesquelles il pouvait parler sans émotion.

En juin dernier nous avons passé une journée et une soirée à Dijon. Tout avait commencé dans le TGV. Alain qui lisait *Voyage au bout de la nuit* était tombé en arrêt devant la phrase de Parapine “Entre le pénis et les Mathématiques, monsieur Baryton, il n'existe rien ! Rien ! C'est le vide”. Nous voilà donc lancés à grande vitesse sur toutes les variantes et inventions possibles. Moshé se mit à philosopher bien sûr, et à tirer la quintessence de la formule. Quels rires, mes amis ! A deux heures du matin nous nous esclaffions encore après un dîner particulièrement inspiré, au cours duquel Moshé avait parlé avec une émotion communicative de Goya et de Dostoïevski. Comme il avait aussi d'authentiques talents d'imitateur il nous avait régaliés de l'irrésistible scène entre le Samouraï et la Geisha. Inoubliable !

Il y a des moments dans la vie où l'on doute, où l'on a peur parce que l'on comprend qu'il peut vous arriver des trucs pas gais, des ennuis. Dans ces moments-là je me disais “Qui irais-je voir si...” C'était Moshé le sauveur qui se présentait avec un bon sourire et des solutions plein les bras.

La première rencontre d'Alain avec Moshé remonte à l'été 66, à Paris où il était monté pour la première fois de sa vie, pour passer l'oral du concours de l'ENS.

Dès cette première rencontre, Moshé m'a sorti d'un mauvais pas en me regonflant le moral après un oral catastrophique de chimie qui avait mis en évidence mon ignorance totale du sujet.

Quelques minutes de discussion avec lui ont toujours suffi pour me débarrasser des complexes que faisaient naître mon ignorance ou ma maladresse devant la rigueur des institutions et la sévérité des autorités intellectuelles en place. Son optimisme inébranlable et son irrespect pour la chose établie faisaient bien vite voler en éclats tous mes doutes. Et Hop ! c'était reparti pour un tour. Moshé a toujours été pour moi l'ultime recours dans les situations difficiles de l'existence.

Nous avions d'innombrables discussions scientifiques, ponctuées de jugements définitifs sur les acteurs en vue et la dernière théorie à la mode. Il fallait bien régler le cas de *x* ou *y* qui tentait de passer la porte étroite entre paranoïa et mégalomanie

que si peu de scientifiques arrivent à franchir avec l'âge. J'ai eu la chance de collaborer avec Daniel et Moshé il y a quelques années et un jeune Strasbourgeois vient de faire une bien belle thèse qui prolonge notre travail.

La personnalité flamboyante de Moshé n'engendrait ni la mélancolie ni l'indifférence. Son imagination inépuisable et son intelligence si vive lui permettaient d'être à l'aise dans tous les milieux, et de plain-pied sur n'importe quel sujet.

Une question un peu baroque m'a souvent visité. A quoi ressemblerait l'existence si notre terre gravitait autour de plusieurs soleils ? Le départ de Moshé m'a fait comprendre la réponse. L'un d'entre eux, et non des moindres, vient de disparaître derrière l'horizon.

Danye et Alain Connes, Paris, Mars 1999.

MOSHÉ FLATO was no doubt the most generous, humane, and interesting person my wife and I have met. Since it is impossible to do justice to his personality, to his contributions to science, and to describe the influence he has had on our lives in one or two pages, I shall have to be satisfied with some snapshots from our meetings with Moshé.

The message of the seminar Moshé gave the first time I met him was in a way typical for Moshé's attitude in science, and maybe generally in life: nothing is impossible, or as he would put it, imitating a thick Russian accent, many things are ‘possible but difficult’. The topic at this particular occasion was a counterexample to the at that time – this was in connection with Moshé's first visit to Stockholm, in 1967 – popular ‘no-go-theorems’ on the impossibility of combining in a non-trivial way relativistic spacetime symmetry and internal symmetry in particle and field theory.

Though I was impressed by Moshé's personal and vivid presentation at this seminar, I could not then foresee the impact on our future lives, and on the scientific development of our department, that would develop from this first meeting. A few years later (in 1970-71), Moshé was appointed as Nordita Guest Professor in Physics at the Royal Institute of Technology (KTH). That year, which Moshé spent with Daniel and Jacques in Stockholm, was to have a lasting influence on our department.

On the scientific side, Moshé gave then an unusual lecture series ‘Quantum Mechanics for Pedestrians’ which was very inspiring for the younger students. Also the Doctoral Theses some years later by Håkan Snellman and Göran Lindblad were worked out with or inspired by contacts with Moshé and his collaborators. During his frequent visits to Sweden, he gave numerous inspiring seminars. His visits, and those to France by many members of our department, permitted an extraordinary exchange of opinions on many domains of physics and beyond. It goes without saying (though I cannot elaborate) that the frank opinions which Moshé gave during many informal discussions in Sweden, France and elsewhere, were appreciated.

But above all, Moshé's warm personality melted and softened the sometimes cool Swedish climate at the department. As he had done with me, Moshé developed a strong friendship with Lamek Hulthén, the department head in the 60's and 70's. Soon that friendship extended to Lamek's wife Berta and to their children; with the latter, typically for Moshé, it deepened over the years after the parents' death.

Visiting Moshé in Paris and going with him to Dijon to listen to, or give a seminar, was always a memorable experience, both from the scientific and from the human point of view. In Paris, the scientific discussion was of a socratic kind. Moshé's fantastic memory was primarily auditive, and he preferred talking and listening to reading. Even on subjects far from his direct field of interest and research, he often had interesting and inspiring, not to mention witty, comments. His command of mathematical physics and mathematics was impressive, and in mathematics he was well seconded by Daniel and Jacques. At dinner, during later years often at home, with the elegant tableware of Daniel's inheritance, and exquisite food often prepared by Moshé's cook Jeannine (or by Daniel) under Moshé's occasional and sometimes

cursing surveillance, accompanied by some fine wine from Daniel's selection, Moshé presided as the 'Last King of Paris' (as one of his American friends once called him). The conversation, guided of course by Moshé and interspersed with hearty laughter, ranged over all areas of human experience.

In Dijon, the long afternoons at the department on Thursday or Friday were finally interrupted by Moshé's loud call "séminaire !" in the corridor, generally a couple of hours behind the announced schedule. The evening was usually finished with a large gathering of guests and department members at one of Dijon's star restaurants.

Moshé's ease of communicating and making friends with people of all ages and positions in life – except the pompous ones – was truly amazing. Since he had a sweet tooth, this sometimes proved a natural access to children's hearts, as exemplified by a cleaning woman's daughter, who used to call him Monsieur Gâteaux.

Let me end with an example, vivid in Maj-Britt's memory, of Moshé's compassion and care even for not so close friends in distress. Moshé had developed strong chemistry with Gunnar Källén at a Conference near Paris in 1966. He was deeply touched by Källén's tragic death in an airplane crash in 1968, and by the fate of his wife Gunnel, who survived the accident, but was already then fatally ill. To cheer her up Moshé invited her to Paris, but she died before she could go, although the prospect of the travel made her last weeks brighter. The airplane ticket was found on her bedside table. Visiting Moshé in Paris, we received information from Sweden about her death. When we told Moshé he burst into tears, especially moved by the thought of the future of the four Källén children.

It has been a privilege and a pleasure for both of us to have been counted among Moshé's friends. The world seems grayer and colder without him.

Bengt Nagel with Maj-Britt, Stockholm, March 1999.

SN the fall of 1968, as I came home with my family from two years in Copenhagen, I first heard about Moshé Flato. One of the young researchers at our department told of a French-Israeli mathematician who had visited Stockholm, who wanted to regularize quantum field theory with gravitation and who was a master of symmetries. It didn't give me any clear idea, but I was soon to find out better.

When Moshé came to Stockholm next time, I took my chance. At the Opera, they gave Busoni's *Faust* in a *mise en scène* with laser beams as the demons! Hearing that Moshé was interested in music, I invited him in the hope that this ultramodern set up would interest him, but I think in the end that Moshé liked Gounod's version of *Faust* better; that type of music was more to his taste. We nevertheless became good friends, and he slowly and patiently introduced me into his world of mathematical physics.

In May 1970, I visited Moshé in Paris for a month, together with my colleague Göran Lindblad. In coffee-shops and in the crammed apartment at Rue Rollin we had intense discussions on all aspects of physics and mathematics, not to mention innumerable other topics as well that Moshé was able to be updated on due to his vast interests and formidable memory.

Moshé was a person who would always try to follow your thinking far out into deep waters, as long as he felt some new thought was worthwhile exploring. He did not kill an idea just because it was not well behaved and immature. This supportive and genuinely helpful attitude of Moshé was immensely important to a young scientist like me and I know it has been to many others.

At that time I was interested in certain aspects of current algebras, in particular whether the charge operators could be shown to be observables. I had found some reasonable conditions under which this was possible and Moshé immediately was interested, encouraging and helpful. This was later to lead to further joint work on the integrability of Lie-algebra representations.

In the fall of 1970, Moshé came, with his friends and collaborators Daniel Sternheimer and Jacques Simon, to the Royal Institute of Technology (KTH) in Stockholm for one year as Nordita guest professor. This was to change the course of theoretical physics, and even the lives of several of us young students. Not only so in a gastronomical way, with unforgettable lunches and dinners, but also from the French-Swedish collaborative point of view, greatly aided by Moshé's friend Dr G. Karpman, French *attaché scientifique* in Stockholm at that time. This started as a series of conferences which Moshé initiated in 1967 with our group at KTH and with his friend Gunnar Källén; they were given Källén's name since Källén died a few months before the first event. Later this was to develop into a French-Polish-Swedish collaboration network with the late Ryszard Raczka of Warsaw at the Polish side.

At KTH, Moshé gave five lectures on 'Quantum mechanics for pedestrians'. They came about from a bet. The audience of students in a lecture at KTH was said to decline almost exponentially with the number of lectures. Moshé claimed that he

would give five lectures on quantum mechanics to students and keep more than half of the audience at the last lecture. He won the bet.

The strong impression and inspiration Moshé had on my scientific work extended on the personal side to a warm and bright, life-long friendship also with my family. By the end of the year, he suggested I should go with him to Paris and also helped me to obtain funding within the bilateral French-Swedish scientific exchange program. In the fall of 1971, my family and me were able to settle in Boulogne–Billancourt for one year. This was to be an unusually fruitful year for me, and my own research was to follow ideas developed in collaboration with Moshé during these years well into the late 70's. One of my students, Göran Tengstrand, also made part of his thesis along these lines.

Throughout the years to follow I was privileged to be able to meet and discuss with Moshé many times, and each time was like an injection of intellectual and emotional vitamins in the blood circulation. When I look back on these times, my first reaction is gratitude. Gratitude that providence allowed my life-line to cross with his, and come into contact with his warm personality and bright intellect.

Moshé's warm radiation and interest in people also gave him a natural ability to become friends with people of all ages and walks of life, not least children, and children are often very sensitive to how elderly people relate to them. Our children became very friendly with him and they always felt his genuine interest in their whereabouts. Later in life, they visited him and Daniel in Paris several times and tried always to be around whenever they heard that Moshé was to visit Sweden. In late October 1998, when Moshé and Daniel visited the Mittag-Leffler Institute in Stockholm, we could all come together again in our home. Little did we then suspect that this was to be the last time.

A truly great and generous soul has passed on to other orbits of existence, but his light is still warming all of us who were given the privilege of knowing him.

Håkan Snellman, Stockholm, March 1999.

N Outstanding Scientist and Our Respected Friend

Professor Moshé Flato, a beloved and respected friend of ours, passed away in November of 1998. This came as a shock to us. With great sorrow, we shall cherish his memory and friendship forever.

We first met him in early 1980's when he was visiting Fudan University together with Professor Daniel Sternheimer. Full of friendly feelings towards and great interest in China's reform and opening-up, he had been closely looking at and felt excited about all the achievements made in China. The two professors saw a lot of places in Shanghai, and sneaked for a day into the nearby city of Suzhou that was not yet freely accessible to foreign visitors.

In his talks with us, Professor Moshé Flato emphasized that modern mathematical physics has gone far beyond its classical stage and it is by no means confined to solving linear problems in this area. A variety of profound theories have mushroomed up as a result of the interaction with modern mathematics covering algebra, analysis, geometry, topology, etc., and the requirement for the development of physics. When he learned that both of us were interested in the research of differential geometry and partial differential equations, he got excited, saying these were two important areas closely related to modern mathematical physics. We were very much impressed by his erudition and informativeness about many frontier problems in mathematics and physics. We were very pleased to make friends with such a prominent scholar of many accomplishments. He was also an elegant speech-maker, being an expert at presenting most difficult theories in clear words and expressive language, highlighting major ideas and offering insights into the significance and prospect of the things being discussed. His talks and lectures, rich in content and humorous in style, often set off the audiences into laughters. Indeed, listening to his speeches was a real enjoyment.

Professor Moshé Flato's special care for Fudan University was evidenced by his frequent visits. During his stays in the university, his concern for the growth of young people proved encouraging to them in their studies. To inspire their research, he initiated the UAP Prize at Fudan University. As an appreciation of his academic achievements and friendly support, he was awarded an honorary professorship by the university in 1986.

Both of us were honored to receive a number of invitations from him to visit Dijon. We made the journeys either together or separately, usually staying in Paris and then, on Thursday or Friday, going to Dijon with him and participating in academic activities under his sponsorship. Sometimes we would go directly to Dijon and stay there for a period of time, where we found his schedule often filled with seminars and lectures. He never seemed tired, giving advice to young scholars, talking about work with his colleagues, and discussing research problems with other scientists over the telephone. In seminars and discussions, he was both strict and warm with young people, making out everything he heard and losing no time in summing up major ideas and pointing out directions for further research. He was truly a master in offering guidance and advice.

We both had the pleasure of being invited to make several lectures in his seminars on differential geometry, Yang-Mills equations and integrable systems, in which he never failed to show keen interest, and he conducted fruitful discussions with us. As we recall, it was just during one of our stays in Dijon that we started our work on Darboux transformations. At that time we had just begun our research in the field, and we were much in debt to Professor Moshé Flato for his well-informed talks on integrable systems and related topics. Subsequently, we successfully derived a series of significant results along this line, and later even became frequent contributors for the high-quality journal *Letters in Mathematical Physics* for which Professor Moshé Flato was the founder and Editor-in-chief.

During our stays in Dijon, Professor Moshé Flato told us a great deal about the local conditions and customs in Europe. Moreover, thanks to his introductions, we came into acquaintance with a number of outstanding scholars.

In his talks and discussions, Professor Moshé Flato explicated many important aspects of modern mathematical physics, many of which had attracted his own interests and some led to significant achievements, including nonlinear representation of Lie groups, deformation and cohomology of Lie algebras, conformal field theory, quantizations of physical systems and nonlinear evolution equations. We could not say that we understood everything he had said and done, but we did know that we benefited much from that.

We have been very respectful of his personalities and much impressed by his honesty, frankness, zeal, and kindness. In many Chinese temples, one may see the Laughing Buddha, plump and kindly looking. Once on a sight-seeing tour, Professor Moshé Flato's kind smiles were so infectious that some tourists around said jokingly that he was the very image of the Laughing Buddha. Here, we should also like to add that he was a man knowing well what to love and what to hate. He would never hesitate to say openly and clearly what he was not for, even not being afraid that he might offend someone else.

Quick-witted and ingenious, Professor Moshé Flato felt quite at home while touring in China, and he was very associable with various people despite of his little knowledge of the Chinese language. He was once invited to dinner by a university in Hangzhou. At the beginning of the dinner party, the host made an informal speech of welcome. He did not wait for the speech to be translated when he cut in saying, 'I'll do the interpretation'. Obviously he was just guessing what he had heard and his 'interpretation' in English was so close in meaning to the original that the entire party burst into loud laughter.

In November 1997, Professor Moshé Flato paid his last visit to Shanghai. We accompanied him on the tour, first scaling the Eastern Pearl TV Tower to have a bird's eye view of Shanghai and then having sightseeing of the Tai Lake at Wuxi. He was full of praise for the rapid advances Shanghai made in recent years. On the other hand, he did not fail to point out that a good deal was still to be done and, in particular,

the people working in tourism were to be better trained before the industry and its management could expect to reach the international standard.

Towards the end of his visit, he once again invited us to stay with him in Paris and Dijon, and we were planning this trip when, to our deep sorrow, the news of his death came. Here in grief, we wish to extend again our heartfelt thanks to Professor Moshé Flato and his collaborators D. Sternheimer, J. C. H. Simon and E. Taflin for their article that was specially ‘dedicated to Gu Chaohao on occasion of his seventieth birthday’. In that article, the authors made a survey of their fruitful research into nonlinear wave equations, including the significant results of the work on Cauchy problems and asymptotic behavior at infinity and those on the infrared problem of Maxwell–Dirac equations in particular. We shall always treasure this article as a most precious momento from our beloved and respected friend Professor Moshé Flato.

Gu Chaohao and Hu Hesheng, Shanghai, March 1999.

Epilogue

Moshé's sister Irit, his mother Anna and I received a large number of visits, phone calls, letters and e-mail messages when the news of Moshé's death started to spread. In our Paris flat, where Irit arrived as soon as she was informed of Moshé's condition, both phone lines were almost constantly ringing (not to mention the portable phone which Irit had brought from Israel) and e-mail was going back and forth all over the world. All the messages we received by these various means of communication were coming from the heart – all expressing in many different and very personal ways the place Moshé had taken in the lives of those who had the privilege to meet him, even only once.

Reproducing all of these would have been out of place (and besides would have taken a whole volume of *LMP*). Kluwer and *LMP* Editors decided to ask a few friends from all over the world to pay a short personal tribute to Moshé. The result one can see in the previous pages is eloquent. Some more will be published with the Proceedings of 'Conférence Moshé Flato' and a number of papers, in *LMP* and elsewhere, are dedicated to his memory.

Still, it is impossible not to give a flavor of what the 'rank and file' of Moshé's friends wrote spontaneously. It is characteristic of the impact he had on everybody, even those he met just a few times. His heart was so great, his memory so unusual and his mind so quick that he could pay attention to everyone, whatever their age, social or intellectual level may be – with a personal touch to each.

An uncle of mine, an MD, was, during World War II, affiliated with the University of Chicago, following medically many professors and researchers, including mathematicians (at that time Chicago was maybe the top department in the U.S.) and the physicists who participated in the Manhattan project: he was in personal contact with, and became a friend of, many of the brightest minds of this century. He had met Moshé with me on a number of occasions (until his death in 1976). He told me once that he had never met anybody with a mind as quick as Moshé's.

Moshé remembered every one he met and, of course, no one could forget him. In line with this special feature of his, we reproduce herebelow excerpts from some messages received; the authors will recognize their statements, and excuse us for having made a collective medley out of them. We conclude this part with the epitaph from Moshé's obituary announcement published in *Le Monde*.

Daniel Sternheimer, March 1999.

“We shall miss Moshé, his warmth, his jokes, his storytelling, his comments on life – maybe even his smoking! We shall miss the warm hearted, generous to a fault, fun, serious Moshé – always with an opinion, a comment. How he kept us in stitches.”

“I am sad, sad, sad. To me, Moshé always appeared bigger than life – that something which made Moshé his inimitable self. Ever since we were children together. Knowing he has passed away, life somehow seems a little emptier.”

“That is awful. Just awful.”

“It is difficult to formulate what I feel about the loss of Moshé: once written it becomes definitive, static and so unlike the energy that always emanated from Moshé. He had a very special place in other people’s lives, which is now empty. It is felt even by those like me, who met Moshé only a few times. I guess it was his interest in people that was the most striking. He was kind and generous, but also provocative and mischievous (always enjoying the reactions of those around him). I remember our first encounter: It was in a small Parisian café on rue Gay-Lussac. Moshé was entertaining us with obscenities in Russian concerning the congress we were all attending. His comments were very rude but imaginative. Before meeting him I knew that Moshé helped many Russians at various stages of their careers in different countries, even in Russia! In that café, I was meeting a legend who was swearing in Russian and then paid for everybody with such grace that it was accepted with pleasure.”

“Any who felt the warmth and was charmed by his bigger than life personality has suffered a great loss. He was a unique individual with unbounded generosity. He was true to himself. He lived life the way he wanted and made no compromises to his principles. There are very few people in this world one say that about. Even though he entered my life at only small intervals, I am grateful for even those small contacts. His impact is unforgettable and will always be there.”

“Moshé was a memorable player the mathematical community and I can only say that I would have liked to have known him better.”

“It is hard to think of a person who had fuller life than Moshé did. He was a master of his domain and was surrounded by devoted friends. His passing is a great loss to us.”

“Without Moshé, Paris won’t be the same for us, anymore! It is very hard to imagine not to be able to visit Moshé and chat with him.”

“Moshé was one of the most generous and sensitive people I have ever known; yet he always seemed embarrassed by it and tried to downplay, if not totally deny, it. We have lost a true friend.”

“I have never met such a charismatic person and at the same time so kind-hearted and generous. He opened sides in [my father]’s personality that I did not see often.”

“I have lost a beloved friend. Since I first met Moshé 20 years ago, a strong channel of mutual sympathy, fairness, trust and affection was established between us. It will not be easy for me to accept this abrupt physical end to it, though I am pretty sure that the remembrances of Moshé’s extraordinary brilliance, deep and broad knowledge, contagious joy, and friendly magnanimity will never die in my heart.”

“It is hard to believe he has left us. I owed him a great deal and will have to live with the fact that I cannot now tell him how much I appreciated his help and especially his friendship.”

“Moshé was the most generous, knowledgeable, pleasant and sensitive person we ever knew.”

“We are all overcome with pain and sorrow. He will leave so fond memories in so many.”

“He was a distinguished mathematical physicist and we appreciated very much inspiring contacts with him. He will be missed by his numerous Polish friends.”

“We all lost a good friend, a man of unique talent and personality who cannot be replaced. The science will be not the same without Moshé Flato.

“This is not only a loss for Moshé’s family and all of Moshé’s friends and colleagues, but also a loss for the society of mathematics and physics. For me, one of his students, I lost a friend and an advisor, in my academic life and in my life as a whole. It is hard to express my sorrow. Moshé’s smile and voice is so deeply engraved in our memory, and now appears as just in front of us ...”

“His work on mathematical physics and his personality have been a continuous inspiration to my study and research. I am very saddened by the sudden loss to our community.”

“Like so many others who knew and loved him, his absence will be a permanent void for us. Our numerous encounters will remain among our fondest and most cherished memories.”

“Moshé has been for us not only an esteemed colleague with great scientific views, but also a close friend, whose great humanity we all appreciated.”

“A generous, outgoing person with tremendous *joie de vivre*, Moshé Flato will be greatly missed.”

“I have been carrying the sad news of Moshé’s passing with me for a number of days now, not too busy or distracted to respond to the heart-wrenching messages of Moshé’s failure and passing, but too much at a loss for words adequate to express my own feelings of sadness at the passing of such a great friend and such a great man. On the day I heard the news of Moshé’s passing, I went to St. Patrick’s Cathedral in New York to pray for him. As I sat there quietly, more than twenty years of memories came back to me...”

“I’ve been thinking about Moshé quite a lot these past few weeks and the impact he had on so many people. I treasure the many good times we had together going more than 20 years back in time. Interesting how the many friends he made stuck to him like glue over the years. He was a magnetic personality. He was certainly brilliant but I think the reason why most people were attracted to him had more to do with his genuineness. You only had to wait a few seconds to find out how he felt about any subject – no subject was too revered. He was a great conversationalist and a very funny man.”

“It was a lucky day for us when we met him more than 20 years ago, remarkable that we could keep in touch and especially lucky that we were able to serve in Paris. The best part of living three years in Paris was having Moshé for a neighbor and friend. Goodbye Uncle Moshé!”

“Behind that gruff exterior lay a heart of extraordinary kindness. I have been a recipient of this kindness so many times. I had always admired the quickness of his mind, his phenomenal memory and great insight. He was lavish in giving his time to others. He was especially generous to young people, understood their difficulties at the start of their scientific careers, and helped them in every possible way. He treated his friends royally, and influenced their lives in ways that cannot be enumerated. Moshé was the only man I have known of whom it could be said that he was larger than life. He pushed himself and others around him without any slackening and lived on the creative edge all the time, right up to the moment of his death. According to the Hindu view of life this is one of the noblest ways to live and die. When I learnt of Moshé’s death I was reminded of Isaac Stern’s words on the occasion of David Oistrakh’s death, when he referred to Oistrakh as a golden man. Moshé was a golden man.”

“Moshé was a very caring, sensitive man who was a very loyal friend. I mourn our loss.”

“Somehow, Moshé’s death shocked me unexpectedly hard: I had not fully realized how important he was for me. Already after our first meeting, I felt that Moshé can be a really good friend. Part of being a good friend is to be critical, and Moshé could be very critical. Sometimes his criticism was very upsetting and somewhat discouraging, but it was honest and fair. After Moshé first criticized me (rather sharply), I was upset for a few hours, until I realized that he was absolutely right. When I came to the States I had some illusions and definitely some aberrations. It was largely due to Moshé comments and remarks that I found myself socially adequate. In this sense Moshé’s was almost unique: he could say truth which I would otherwise try not to notice and which others, including the very best friends, would not say.”

“Moshé was a phenomenon.”

“J’appréiais sa rigueur intellectuelle, cette façon si particulière qu’il avait de ne pas plier, la vivacité des discussions scientifiques avec lui. J’aimais en lui sa tonitruante timidité, son émotion quand il évoquait (rarement) Israël et l’espérance né (et peut-être un peu déçu) là-bas, ce socialisme humain qu’il défendait.”

“Il y a une trentaine d’années, à l’IHP, j’avais aimé sa vivacité et son humour. Je l’ai retrouvé dans l’actuelle Section 25 du CNU et dans sa contribution à nos travaux nous avons apprécié sa compétence, l’étendue de ses connaissances et la vigueur de ses interventions.”

“Ma collaboration avec Monsieur Flato m’a fait découvrir un homme rigoureux, généreux, certes avec une forte personnalité mais d’une simplicité qui le rendait accessible à tous.”

“Je me souviens que Schützenberger disait que le problème de Moshé était de cacher sa générosité derrière un dehors intransigeant.”

“Moshé était un des êtres les plus sensibles et les plus délicats qu’il me fut donné de rencontrer et bien que nous ne fussions pas des proches dans la vie, nous l’étions de cœur car il m’a souvent dit des choses plus justes et plus intimes que tant d’autres que je côtoie quotidiennement. Il nous manquera à tous.”

“Il faisait tellement partie de nous que parler de lui au passé c’est accepter qu’une partie de nous ait disparu. C’est sans doute vrai mais si dur à dire.... Son intelligence, sa qualité de communication, son respect des autres jusque dans leurs insuffisances, ne nous ont jamais permis de voir combien il était différent de la plupart d’entre nous, combien il nous était tout simplement supérieur.”

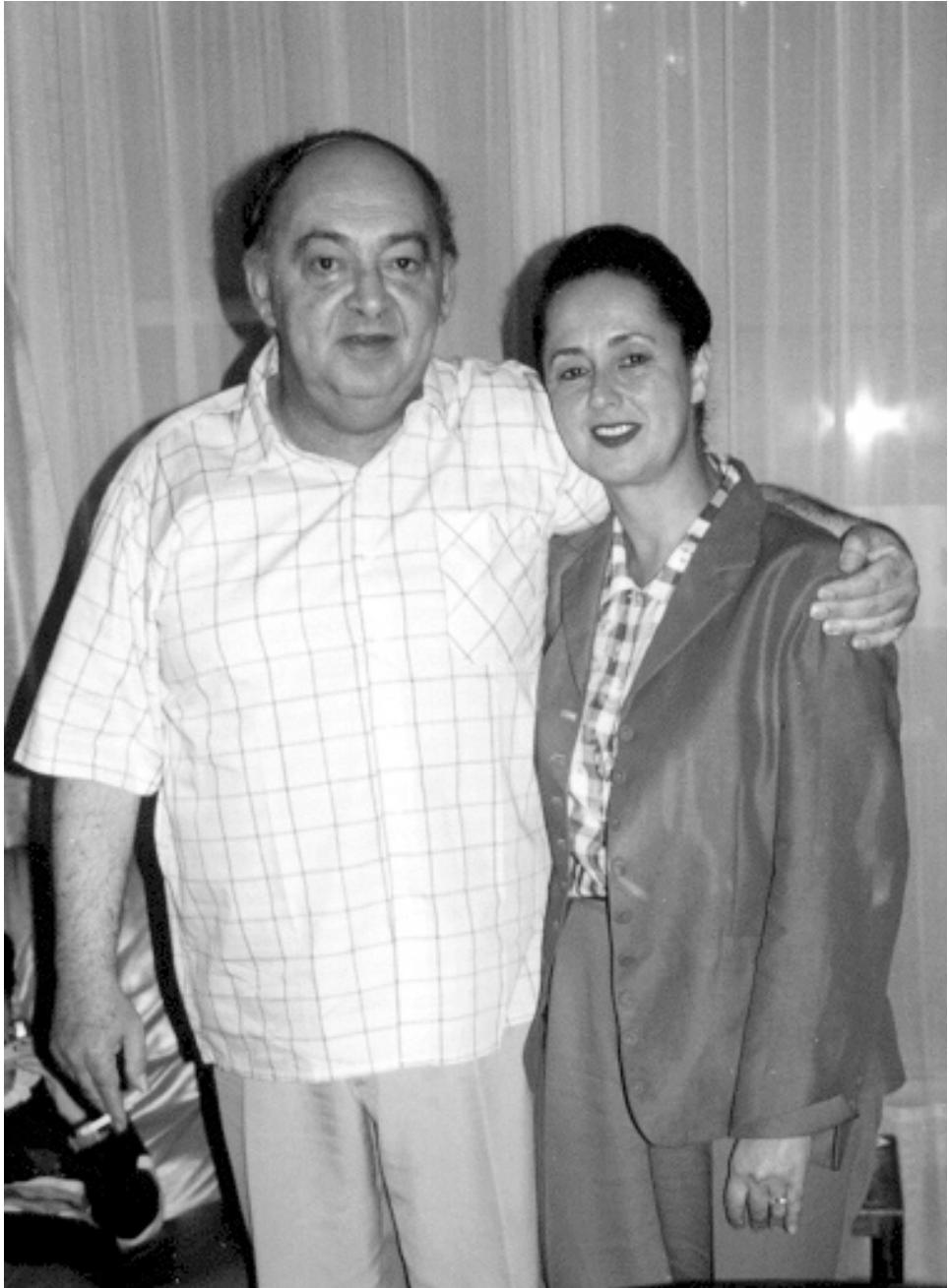
“Le vide laissé par Moshé est certes effrayant, mais tout ce qu’il a engendré tant au plan scientifique qu’au plan des relations humaines devrait nous aider à supporter ce vide.”

“Il est parti, mais les géants ne disparaissent jamais complètement. Il était grand en gueule, en connaissance, en gentillesse, en générosité.”

“Moshé est bien là parmi nous, bon vivant, honnête, penseur et mathématicien devant l’Éternel. Il nous invite à poursuivre notre route en nous traitant d’imbéciles quand il le faut.”

From *Le Monde*, dated December 6–7, 1998

*Il vécut et mourut comme une supernova,
Laissant un grand vide, son rayonnement,
Illuminant par son intelligence et son humanité
Tous ceux qui eurent le privilège de le connaître.*



Moshé and sister Irit, Paris 1997.