Speeches and Messages

delivered at the Conference by personalities, speakers or session chairs, and contributed to the Proceedings.

SHALOM HAVER

Moshé Flato, arrivé comme Professeur à l'Université de Bourgogne le 1er janvier 1968, y a gravi tous les échelons de sa carrière universitaire, que la mort a prématurément interrompue à l'automne de 1998.

Mais chacun sait que son parcours, administrativement linéaire, n'a pas été pour lui-même, son entourage et ses collègues, ce long fleuve tranquille, souvent décrit. Sa personnalité marquée, sa liberté et son originalité créatrice, ne pouvaient en faire un professeur «standard» et discret.

Non, il fut pour les Présidents de l'Université l'un de ceux, heureusement rares, qui pimentent l'exercice de leur fonction. Mais il n'aurait été que cela que nous n'aurions pas été amenés à témoigner aujourd'hui dans les premières pages d'un recueil scientifique qui lui est dédié.

En effet, son apport dans le domaine de la Physique Mathématique, qu'il a si brillamment authentifié, s'est construit à partir des fondations qu'il a bâties dans notre Université. Nous voulons rappeler la création du Laboratoire de Physique Mathématique, creuset de sa créativité, et la naissance en 1975 du Journal scientifique «Letters in Mathematical Physics» dont la réputation est maintenant bien établie. Aujourd'hui, notre Université bénéficie d'une place de choix dans la reconnaissance internationale de son pôle en Sciences mathématiques. C'est à une génération de fondateurs intrépides, dont il fut, qu'elle le doit. En hommage à leur œuvre, l'Université souhaite que les continuateurs s'obligent à la même ambition.

C'est peut-être une équation personnelle singulière «non triviale» que Moshé Flato a cherché à résoudre dans toute son activité et sa réflexion. Sa personnalité s'est rapidement affirmée dans le choc des cultures et des idées de l'après guerre, et dans la recherche d'une certaine stabilité dans un environnement particulièrement instable. Il a façonné sa carrière scientifique par son propre acharnement à la réussir. Il a dû à tous âges et constamment démontrer, prouver, convaincre. Mais sa curiosité sans limites et sans frontières fut à la fois intuitive et savante, logique et aléatoire, rigoureuse et passionnée et s'exprima sous des formes aussi bien populaires qu'élégantes. Chacun de nous peut retrouver dans ses souvenirs trace de cette étrange «cuisine», qui fit de lui cet attracteur libre et controversé.

Il ne nous revient pas de juger son œuvre mais le succès de ses publications, du journal LMP, et la somme de témoignages émouvants du monde entier que son décès imprévu et prématuré a suscitée, prouvent l'intensité de son facteur d'impact.

G. Dito and D. Sternheimer (eds.), Conférence Moshé Flato 1999, Vol. 1, 3 – 22.

Ces témoignages viennent, a posteriori, donner raison à ceux qui, malgré bien des écarts à l'orthodoxie administrative, budgétaire et pédagogique, et quelques éclats de voix contestataires, ont aimé retrouver sa démarche, sa science, sa culture et ses passions.

De fait, l'Université, Dijon et la Bourgogne, où il aimait poser le sac, ont vibré de sa forte présence, et ont accueilli régulièrement les discussions scientifiques prolongées de ses amis qu'il y faisait converger.

Nous sommes aujourd'hui orphelins de ce collègue hors pair et nous gardons tous depuis ce 27 novembre 1998, comme une richesse, tout ce que nous avons partagé avec lui.

Shalom Haver
Salut, camarade...

Bernard Laurin
Président de l'Université de Bourgogne

Gilles Bertrand
Vice-Président du Conseil scientifique
Ancien Président de l'Université (1988–1993)

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Message de Madame Edith Cresson, ancien Premier Ministre
lu par Monsieur Hubert Curien

Madame la Présidente Yvette Chassagne, Messieurs les Professeurs Daniel Sternheimer et Jacques Simon, Mesdames et Messieurs les Professeurs, Mesdames, Messieurs,

Permettez-moi tout d'abord de vous dire combien je suis présente avec vous par la pensée, même si les obligations de mon emploi du temps ne m'ont malheureusement pas permis de me rendre à Dijon aujourd'hui.

J'ai été très honorée et émue que l'on m'ait proposé d'accorder mon patronage à cette session inaugurale.

Cela fera bientôt un an que le Professeur Moshé Flato fut enlevé à notre affection à l'âge de 61 ans. Son décès brutal et prématuré fut pour nous tous un véritable choc. Ses amis sont aujourd'hui réunis pour lui rendre hommage. Et nous pouvons mesurer à quel point ces amis sont nombreux, originaires des quatre coins de la planète et venant des horizons les plus variés, pas seulement scientifiques.

Car là était l'une des grandes qualités de Moshé Flato. Sa forte personnalité, imaginative et démonstrative, laissait rarement indifférent. Son caractère ouvert et entier fut à l'origine de nombre d'amitiés indéfectibles.

Pour ma part, j'avais eu l'occasion de rencontrer Moshé Flato à plusieurs reprises, notamment comme Ministre de l'Industrie et à l'époque où, Ministre des Affaires Européennes, j'avais créé les GEM, les Groupes Européens de Mobilisation. Je l'avais revu, plus récemment, à Bruxelles dans le cadre de mes fonctions de Commissaire européen.

A chacune de ces rencontres, il m'avait fortement impressionnée par son ouverture d'esprit, par son inventivité, par la justesse de ses analyses et par l'étendue de ses connaissances.

Mais, si la personnalité si attachante de Moshé Flato conduit à le rendre inoubliable dans nos cœurs, il n'en reste pas moins, bien entendu, que sa principale contribution est son œuvre scientifique dans le domaine de la mathématique physique. Cela fait aujourd'hui plus de trente ans depuis la fondation à Dijon du Laboratoire de Mathématique Physique, et près de 25 ans depuis le lancement de *Letters in Mathematical Physics*. Son œuvre lui survivra sous l'impulsion de ses collègues, mais elle n'en est pas moins aujourd'hui orpheline.

Nous avons tous pu noter comment ses travaux, non seulement étaient d'une grande qualité scientifique, mais aussi débouchaient sur des applications concrètes, par exemple en matière d'assurance et de finance à travers l'appréciation du risque et la modélisation. Je suis particulièrement sensible à cet aspect : la science n'existe pas pour elle-même, mais elle doit servir le progrès économique et social. C'est notamment pour cette raison que j'ai conçu et lancé le cinquième programme-cadre de recherche de façon à recentrer la recherche communautaire sur la croissance, la compétitivité, l'emploi et les besoins sociaux, en rupture avec l'approche traditionnelle organisée selon les domaines et les disciplines scientifiques.

Cette nouvelle approche encourage l'interdisciplinarité, qui a été matérialisée dans le cinquième programme-cadre par la notion d'action-clé. Moshé Flato était en quelque sorte un précurseur grâce à sa double formation de physicien et de mathématicien.

Mais, au-delà de sa contribution purement scientifique, Moshé Flato a su s'ériger en exemple pour la communauté scientifique. J'en veux pour preuve la haute tenue de *Letters in Mathematical Physics* ou bien la création et l'animation l'Association Internationale de Physique Mathématique.

Demain commencera la partie scientifique de cette conférence. Compte tenu de l'intérêt scientifique du programme, je suis convaincue que Moshé Flato aurait beaucoup aimé y participer. Même si son absence physique se fera particulièrement sentir, il restera plus que jamais présent dans notre mémoire.

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Hubert Curien

Vice-Président de l'Académie des Sciences, Ancien Ministre de la Recherche

Quelle belle initiative prise par nos collègues, et tout spécialement par Daniel Sternheimer, de nous réunir pour parler de Mathématique Physique en honorant la mémoire de notre ami Moshé Flato!

Moshé incarnait la spontanéité et l'imagination. La rapidité de son mécanisme de pensée n'en émoussait d'ailleurs pas la rigueur. Il ne détestait pas de surprendre, il aimait aussi démontrer. Ce qu'il n'aimait pas, c'était se heurter à des frontières, à des barrières. La connaissance était pour lui un champ d'exercices où toutes les sorties valaient d'être tentées. Il se plaisait aussi à rapprocher la création mathématique de la création artistique.

De l'analyse des particules élémentaires et des forces qui régissent le comportement de la matière, des considérations fondamentales sur la symétrie et l'invariance, il savait s'échapper pour aller vers les sciences sociales, l'étude du risque, l'organisation des assurances.

La part de l'œuvre de Moshé Flato qui est considérée par les physiciens théoriciens comme tout-à-fait essentielle est ce que l'on appelle «quantification par déformations». Les meilleurs spécialistes vont, au cours de cette conférence, nous servir de guides dans ce domaine en voie d'essartage.

S'il fallait en deux traits, en deux mots, résumer la personnalité de Moshé Flato, je choisirais intensité et générosité. C'est dans cet esprit aussi que le programme de cette conférence a été composé.

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Allocution de Madame Yvette Chassagne
Ancien Préfet, Président Honoraire de l'Union des Assurances de Paris
lue par Madame Chantalle Reimeringer

Pendant cette conférence, vous parlerez de questions scientifiques en pensant à Moshé. Auparavant, il m'a été demandé de parler de l'ami, de l'homme – parce que je ne saurais pas parler de science et surtout parce qu'il a été ces dernières années, un ami, peut-être plus un frère qu'un ami.

Qui était-il derrière cette façade volontairement humoristique, que cachait cette ironie et cet humour ? D'abord, je crois, une réelle timidité, j'ai failli dire humilité parce que ce savant était humble devant ses semblables, pour autant que ceux-ci répondaient à des critères de valeur morale et de qualités humaines, essentielles à ses yeux. Ce qui l'autorisait à être intraitable avec les autres, inconscient de sa valeur exceptionnelle, inconscient de sa supériorité, gêné lorsqu'elle se révélait malgré lui.

Ensuite un profond respect de l'autre quel qu'il fût, même qualifié amicalement de 'débile', un mot qui contenait beaucoup d'affection. Ce respect est, je crois, la clé de son extraordinaire faculté d'attention et d'écoute, de sa totale disponibilité. Plus encore de sa capacité de répondre à toutes les attentes, même celles qu'on n'osait formuler. Les mois ont passé et je n'ai pu encore admettre qu'il suffisait de téléphoner n'importe où, à n'importe quelle heure pour être compris, conseillé, aidé dans tous les domaines.

Rigoureux, intransigeant, il ne recherchait d'abord chez l'autre que ce qui pouvait le rapprocher de lui. Ses extraordinaires capacités d'analyse et de synthèse, appliquées aux comportements d'autrui, lui ont, pratiquement, toujours donné raison.

Parce que nous partagions la même espérance, les organisateurs m'ont demandé de parler de cette part de nous qui a disparu avec lui. En venant à Dijon aujourd'hui, nous ne pouvons espérer combler le Vide qu'il a laissé derrière lui en chacun d'entre nous. Mais nous pouvons ensemble, quelles que soient nos convictions propres, communier encore une fois dans ce socialisme humain auquel il croyait tant que j'oserai dire qu'il l'incarnait.

Beaucoup de choses importantes seront dites ici, des voix plus qualifiées certes que la mienne parleront de la valeur de ses travaux, des amis plus proches, évoqueront mieux ces avancées et ces perspectives qui définissent si bien l'orientation de sa pensée en tous les domaines.

Si j'ai accepté de dire ces quelques mots, c'est parce que jamais au cours des années passées, pendant lesquelles nous étions si proches, je n'ai osé lui parler de lui, lui dire combien il m'était exceptionnellement précieux. Si je le fais aujourd'hui, c'est pour être un modeste écho de toutes les amitiés silencieuses qu'il avait su nouer autour de lui, de cette affection qu'il portait à tous.

Moshé ne peut pas nous manquer, ce serait la première fois. Si nous sommes réunis, c'est pour être avec lui.

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Jérôme Lichnerowicz

Bonjour.

Ô que c'est difficile! Ce qu'on me demande aujourd'hui est très difficile. Devant des auditeurs que, pour la plupart, je ne connais pas, je dois livrer mes sentiments sur des gens et des moments qui furent d'exception. A la demande des organisateurs de cet hommage, je dois parler d'un absent au nom d'un autre absent.

C'est un exercice de style impossible auquel je me livre avec émotion au nom de l'amitié et de la mémoire. Il n'est pas dans mes habitudes, et ceux qui me connaissent le savent, de livrer mes sentiments. Mais si je fais une exception aujourd'hui, je la fais pour Moshé, André, Daniel, Susa, ma mère.

Je ne vais pas vous parler de science, je n'y connais rien et je n'ai aucune légitimité pour cela. Mais postulant arbitrairement que je suis crédible sur ce sujet, je vais vous parler d'amitié. Je vais vous parler de l'amitié qui a lié pendant plus de trente-cinq ans Moshé Flato et mon père, André Lichnerowicz. Je vais vous parler de cette relation exceptionnelle entre ces deux hommes, de cette relation qui a pris fin lorsqu'ils moururent l'automne dernier, à quelques jours d'intervalle, d'un accident tellement comparable que c'en était troublant, à quelques mètres l'un de l'autre, dans le même hôpital, proches et associés jusqu'au bout peut-être par hasard...

Quand j'évoque ces deux hommes ma mémoire m'envoie des images nombreuses : J'ai vu Moshé, jeune homme mince (eh oui!), venir consulter un homme déjà mûr et j'ai vu la séduction naître entre eux. Adolescent, j'ai vu Moshé que je trouvais trop vieux pour être de ma génération et trop jeune à mes yeux pour être un ami de mon père, trouver sa place chez nous, s'y sentir bien, accepté, reconnu, ayant toujours l'attention et la phrase adaptée à son interlocuteur. J'ai vu mon père, anéanti par un drame familial, se demander s'il avait le droit de guider et de conseiller des plus jeunes. J'ai vu Moshé soutenir et encourager André dans ces moments de doute.

J'ai senti (plus que je ne l'ai vue) la modification de leur rapport dans la recherche. Il n'y avait plus de maître ni d'élève mais une synergie incroyable entre deux amis. J'ai vu Moshé soutenir André quand, les années passant, il doutait de ses capacités créatrices. Et j'imagine sans difficulté que l'inverse eut lieu si ce fut nécessaire. J'ai vu André soutenir à chaque occasion Moshé quand celui-ci a pu être en difficulté, mal jugé par des imbéciles.

J'ai vu mon père, vieux monsieur fatigué, parfois malade et imprudent, traverser la moitié de la ville pour ne pas rater un seul rendez-vous rue de Tournon. J'ai entendu Moshé me dire : «C'est incroyable, il a eu une période à vide, mais là il refait des maths comme avant !»

J'ai entendu André me dire, le jour de la mort de Moshé : «C'était une intelligence fulgurante!». Quelques jours plus tôt, le 16 novembre 1998, j'avais vu Moshé chez mon père. André était malade et j'ai lu une inquiétude immense dans les yeux de Moshé. Je ne les ai plus jamais revus ensemble après ce jour.

Mais je n'ai pas vu que des choses tristes . . . Je me souviens aussi de ces repas gastronomiques, car Moshé et moi communiions dans le plaisir et l'admiration pour les grands chefs. Je me souviens de nos discussions politiques où la modération, la diplomatie et la bonne foi légendaires de Moshé (rappelez-vous donc de ses jugements si nuancés !) n'avaient d'égales que mes arguments sereins et ma pondération tout aussi légendaires ! Je me souviens aussi très bien de Daniel dans ces moments-là, attentif et amusé.

J'ai vu la générosité de Moshé s'exprimer si souvent vis-à-vis de mon père et de toute notre famille que s'il ne doit me rester qu'un seul mot pour parler de lui, c'est celui-ci : *générosité*. Je laisse les autres qualificatifs aux scientifiques, qu'ils m'accordent celui-là.

Il a semblé, à Daniel et aux initiateurs de l'hommage d'aujourd'hui à Moshé Flato, qu'il fallait y associer le souvenir d'André Lichnerowicz. Je dis à tous, avec beaucoup d'émotion, combien cette attention nous a touchée, Susa, Jacques et moi. Et si ma mère n'est pas présente aujourd'hui c'est que sa santé le lui interdit.

Si la rencontre de Moshé et d'André a eu lieu, si elle a débouché sur cette amitié exceptionnelle, s'ils furent si indispensable l'un pour l'autre – la paraphrase est facile – mais c'est «parce que c'était lui et parce que c'était lui».

De mon adolescence à aujourd'hui presque cinquante ans, j'ai avancé avec l'intuition intime qu'ils étaient indissociables dans la science comme dans la vie : ils le furent jusqu'au bout. Ils nous manquent dans leurs ressemblances, leurs différences, leur complémentarité, leur absence.

Merci.

Bernard Loiseau

Jamais Moshé ne serait venu en Bourgogne sans passer par la Côte d'Or. C'était devenu un ami. Il me contait toutes ses aventures épicuriennes de-ci, de-là. Il aimait vraiment la bonne nourriture et les bons vins, et le faisait partager à ses amis. Il fêtait souvent son anniversaire à Saulieu.

Il se délectait de la poularde Dumaine, cuite à la vapeur et farcie de truffes et de foie gras. Il appréciait les écrevisses sautées qu'il décortiquait à la main.

C'était vraiment un épicurien. Comme le disait François Mitterand, il faut toujours avoir une pensée pour ses morts : et bien voilà Moshé je pense à toi et te dis que la poularde et les écrevisses sont toujours aussi bonnes.

A bientôt Moshé !

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Kay and Leon Cooper
read by Noriko Sakurai

A mathematician friend once said, "You Physicists are cowboys – you ride wildly over the range, jumping over fences and herding cattle – then we mathematicians have to come in to clean up the mess. But", he added, "You Physicists have all the fun".

Moshé was one of those rare physicist mathematicians who not only had fun but also didn't leave a mess. His many significant contributions to science are marked by their originality as well as their precision. He was a serious, dedicated and generous scientist, serious about his work, dedicated to his colleagues and students and sharing and generous with his ideas.

We remember Moshé for his penetrating intelligence, his ability to pose the one question that was particulary apt and most difficult to answer, for his gusto, and his 'joie de vivre'. We remember him as a great host, generous and caring to his friends and family. We remember the many times we ate and drank together, the camaraderie, laughter and above all the talk – the lively witty intelligent talk.

There is a silence now that he is gone – a silence that can only imperfectly be replaced by our memory of his lively mind and exuberant presence.

Moshé, your grieving family and your many friends thank you for the joy and laughter you shared with us. We bid you farewell.

Clarice Schwinger
read by Noriko Sakurai

Moshé was a man to be treasured, and we did. We admired his brilliance, respected his integrity, enjoyed his wit, were touched by his compassion and loved the joy he brought.

I trust it will be understood that “we” means Julian and me.
I know the meeting in Dijon will be moving. While I hadn’t expected to be able to join, I am sorry that I can’t.

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Noriko Sakurai

I mourn the unexpected and untimely loss of an irreplaceable friend.

Moshé was a man amongst men.

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Bengt Nagel
K.T.H., Stockholm; former President of the Nobel Committee for Physics

Ladies and gentlemen!

In the short time at my disposal I can give only some reminiscences of my meetings with Moshé, a person who has probably most affected my life and made the deepest impression on me after my immediate relatives and some of my teachers.

I first met Moshé at a seminar in connection with his first visit to Stockholm in 1967, arranged by his friend Gilbert Karpmann, then attaché scientifique at the French Embassy in Stockholm. The topic of Moshé’s seminar was, I think, in a way typical for his attitude in science, and maybe in life: few things are really impossible. The seminar presented a counter-example to the then popular no-go theorems claiming the impossibility of combining in a non-trivial way relativistic spacetime symmetry with internal symmetry in particle and field theory.

After this first visit Moshé, with one or two of his collaborators Daniel Sternheimer and Jacques Simon, often returned to our department of theoretical physics at the Royal Institute of Technology; in particular he was a Nordita Guest Professor in 1970–71.

These visits were always highlights in the life of our department and influenced all members to a larger or smaller degree. The only small trouble we had was to cover up for Moshé’s smoking in seminar and lecture rooms, which was prohibited. However, the last time he visited us, in October last year, he could refrain from smoking during his seminar.

The scientific exchange Paris–Dijon–Stockholm was very important for our group in Stockholm. My two best research students over the years, Göran Lindblad and Håkan Snellman, both owe much to Moshé's help and cooperation for their theses. Snellman wrote part of his dissertation in Paris together with Moshé, Daniel and Jacques, whereas Lindblad, who has always been somewhat of a lone ranger, at least got an important inspiration for his work in discussions with Moshé.

Primarily through his friendship with Lamek Hulthén, creator and then head of our department, and also a long time member and finally chairman of the Nobel Committee for Physics, Moshé got chosen for the special list of scientists who are invited every year to nominate candidates for the Nobel Prize in Physics. I should not pass by the fact that he was sometimes not too happy about the outcome of the committee work, and he certainly did not hide his opinion in such a case.

Moshé's way of doing and teaching science was a sort of socratic dialogue, generally treating also maybe not so bright ideas of his discussion partner in a constructive and understanding way. I think this very successful way of communicating science was related to the fact that Moshé's fantastic memory was largely auditive, related to speech and hearing.

This showed up also in seminars and lectures given by Moshé; they were great, but primarily through the oral impression. The visible remnants were often somewhat erratically scattered symbols, equations and words on the blackboard, and an array of broken pieces of chalk on the floor below. You could hardly imagine Moshé using a projector and overheads.

Moshé's auditive memory was important also for his interest and proficiency in musique and language. He could have become a prominent concert pianist; he could also have earned a handsome living as a professional imitator or impersonator, an ability he used to the delight of his audience, with verbal imitations of friends and foes alike.

Luckily for us mathematical physicists and for our profession Moshé chose to devote his professional life to mathematics and physics.

To sum up:

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

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Message from Ed Witten

read by Ruth Boulet-Kerins from Princeton

I am very sorry not to be here with you today, and I am grateful to Ruth Boulet for offering to convey my greetings. Moshé Flato's ideas and insights have a tremendous impact on physics. There has been a marvelous renewed interest in the last few years in many of Moshé Flato's favorite topics of deformation quantization, singletons, and Anti de Sitter space. Surely he must have enjoyed these developments in the last few years of his life. It is tragic that he is no longer here to help us in advancing the scientific frontiers that so animated him.

This informal letter about Moshé was received some time before the Conference from a very close friend, who authorized publication here but asked not to be formally identified. We include it because it expresses the feelings of many in a form which fits perfectly Mohsé's personality. DS

Cher Daniel,

Tu m'as demandé une contribution personnelle pour le volume en l'honneur de Moshé que vous préparez. J'aurais aimé, tu t'en doutes, savoir dire qui il était, comment il vivait au milieu de ses amis. 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.

J'ai donc essayé de parler de lui, du peu que j'en connaissais réellement (alors que je croyais si bien le connaître). Pour cela il nous faut maintenant emprunter le mode passé, cela me paraît impossible. Il faisait tellement partie de nous que c'est accepter qu'une part de nous-même ait disparu. C'est sans doute vrai, mais si dur à dire.

Je ne peux imaginer qu'une telle réalité soit possible. Je ne peux penser qu'il n'y ait plus à n'importe quelle heure, au téléphone, au bout du monde quelqu'un à qui je puisse dire «le mur de Berlin est tombé», «Rabin a été assassiné» aussi bien que «l'un de mes enfants est malade». Il avait toujours cette surprenante attention, cette aptitude à se mettre à la place de l'autre qui supprimait les explications, les préliminaires. Tout était compris sans être dit, tout était partagé.

Comment pouvait-on ne pas être en colère comme lui, quand il explosait, levant un sourcil terrifié par la stupidité humaine ? Comment supporter le monde tel qu'il est, si Moshé ne l'explique pas, ne le comprend pas à sa manière, à la fois élémentaire et excessive, qui rendait si sûr notre propre jugement ?

Sans doute être quelquefois, le temps d'une pensée, d'une manifestation d'humour, d'une colère, un peu de Moshé, était un privilège rare qui enrichissait l'interlocuteur. En le quittant on se sentait meilleur, plus intelligent, plus apte à anticiper, qu'à l'arrivée. Il faudra sans lui, sans sa compréhension, sans ce qui n'était pas de la compassion mais de la participation, recevoir les peines futures et essayer de les accepter sans sa révolte qui était un tel réconfort.

Peut-on oublier comment tu le débarassais des médiocrités quotidiennes en restant présent à l'entretien. J'ai beaucoup pensé à toi ces derniers temps. On peut tout écrire comme on n'oserait pas parler, mais de tout cœur, tu sais je partage ta peine de cette absence à laquelle nous n'étions pas préparés. Avec Jacques et toi, il était seul à nous expliquer l'inéluctable, à nous accueillir et à nous le faire accepter et peut-être comprendre. Il nous manque tout simplement.

Excuse-moi Daniel, notre amitié m'a paru permettre de dire un peu ce que je sens beaucoup plus. Tout cela n'est pas en termes acceptables pour un ouvrage scientifique, fût-il en son honneur. Je ne pourrais faire un bon devoir de premier jour à son sujet, il l'admettrait et cela le ferait sans doute bien rire.

Je sais que je ne pourrai plus, depuis ce fatal après-midi à l'hôpital Cochin, comme chaque fois que nous nous rencontrions, reconstruire le monde, récrire la Bible ou le Discours de la Méthode en trois phrases.

Tu sais sans doute mieux que moi, car on a dû davantage te le dire, combien tous ceux qui l'avait simplement rencontré ont été blessés, je devrais dire frustrés, par sa disparition.

J'hésite à expédier ces quelques phrases «minables et débiles» aurait-il dit, parce qu'elles vont réveiller une peine, qu'avec une dignité extraordinaire tu as été capable de taire. Tous ses amis doivent être dignes de lui et de toi. C'est pour cela que je préfère t'avoir dit, très mal, trop peu, combien il ne peut vraiment être absent pour nous tous qui l'aimions.

Et pour une fois tu ne m'en voudras pas de te dire qu'on t'aime bien, qu'on t'aime beaucoup, toi le frère qui es encore là avec lui et nous.

A chaque fois que nous perdons quelqu'un, l'un des rares êtres que nous savons irremplaçables et uniques, nous sentons, interdits et heureux en même temps, combien notre cœur meurtri est encore capable de ressentir la douleur et de se révolter contre un sort qui nous ravit beaucoup trop tôt les meilleurs d'entre nous, ceux que nul ne pourra remplacer.

Stephan Zweig

* * *

Message received from Israel M. Gelfand

Dear Daniel,

The death of Moshé is a very great loss. I never make an overstatement. You can trust me that I have regarded Moshé as one of my intellectual closest friends. He was sociologically very important for me and I think that his approach to connection mathematics and physics I like the best.

The journal that he and you founded is one of the best in mathematical physics. For example, this is a main journal I read systematically and in every issue I find two or three very important for me papers. I am very happy that you decided to continue the journal in the same style. I will be more than happy if we will have now more personal contacts.

I start now several interesting works, and I'd like to dedicate the best of them to Moshé's memory.

With love,

I. Gelfand

V. S. Varadarajan

Department of Mathematics, University of California

Talk delivered on Dec 5, 1998, at the Lie group workshop held at UCLA, Dec. 5–6, 1998

Moshé Flato died on Friday, Nov 27, 1998, in Paris, of complications from a massive cerebral haemorrhage he suffered a couple of days earlier. His shocking and untimely death is a tremendous loss to the world of mathematical physics, and even more so, to his family and large circle of friends and admirers. He was buried in Tel-Aviv.

Moshé's work covers a large spectrum of high energy physics, straddling diverse aspects of quantum field theory and elementary particles. His interest was always in fundamental questions. He was constantly searching for a conceptual understanding of the strange world of elementary particles, and explored many new ideas and ways of thinking about them. He created a school in Dijon and Paris and shaped the intellectual developments of a huge number of young scientists, some of whom became his closest friends, such as Daniel Sternheimer and Jacques Simon.

I would like to make some very brief comments on his work. In quantum mechanics there is a famous uniqueness theorem due to Von Neumann and Stone, which says that any system of operators satisfying the Heisenberg–Weyl commutation rules is isomorphic to the standard system which is called the Schrödinger model. The content of this theorem is that there is only one way to quantize a classical system, namely through canonical quantization. In a famous paper published in the mid 1970's, Moshé, and his collaborators Bayen, Fronsdal, Lichnerowicz, and Sternheimer, proved a wonderful variant of this uniqueness in a very different context. Their idea was to think of quantization as a deformation of the Poisson algebra of classical observables. Canonical quantization furnishes such a deformation, the Moyal–Weyl deformation. They proved that this is essentially the only deformation of the classical Poisson algebra. In my opinion this uniqueness theorem lies at a much greater depth than the Von Neumann–Stone theorem and may be thought of as the definitive clarification of the questions that were raised first by Hermann Weyl in 1927 regarding the foundations of quantum physics. The ideas coming out of this paper revolutionized quantization theory, made it possible to think of quantization in contexts where canonical quantization does not make sense (curved space–time, constrained mechanics, etc), and led inevitably to the theory of quantum groups and quantum homogeneous spaces. Recent work on q–quantum mechanics by Finkelstein and others would not have been possible without this seminal achievement.

During the 1980's, Moshé, in collaboration with Frønsdal, made a deep analysis of the representation theory of the conformal group. Their theory of the so called singletons, which was very much ahead of its time, has recently come to the forefront in high energy physics.

Throughout his life he was deeply interested in formulating and understanding the nonlinear aspects of quantum field theory. He called this the “nonlinear program” and wrote many papers on this theme, with Simon and others. His recent work in collaboration with Simon and Taflin is a technical tour de force on the Cauchy problem for the coupled Maxwell and Dirac equations that arise in quantum electrodynamics.

He loved the subject of mathematical physics deeply and was very unhappy that (in those days) there was no forum where important and interesting discoveries in mathematical physics could be published quickly. The physicists had several such journals, but it was often very difficult to get papers published in them because of lack of sympathy of the physics community toward major discoveries that were more mathematical and did not lead to immediate physical interpretations. Moshé understood this situation and with characteristic energy and enthusiasm founded, in 1977, the Letters in Mathematical Physics precisely to correct this anamoly. The Letters has become the premier journal in mathematical physics. If you look through its pages you will find all the major developments in the last two decades represented there when they first came up. There is no question that he was the moving spirit behind the Letters. This is one achievement that will live long after him.

But bigger than all his achievements in science is the fact that he was a decent man. Behind his rough exterior lay a heart of extraordinary generosity. He was lavish in giving his time to others. I learnt a lot of physics by talking to him and reading his papers. 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. He was the only man I have known of whom it could be said that he was larger than life (a comment also made by one of the young scientists who was deeply influenced by Moshé).

As one gets older, one finds invariably that one cannot do all the things that one did when one was young, and certainly not at the depth that was reached in youth. The natural tendency to compensate for this is to reduce one’s ambitions and do what one can to advance science. Moshé scorned this way of living. 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.

Collection of addresses by session chairs

Marcel Guenin, former Rector of Geneva University

My first real interaction, not my first meeting, with Moshé was in 1972 in Moscow. As you already know, Moshé was very fluent in Russian. But he had not bothered with learning the cyrillic alphabet, which was about the only thing I knew in the Russian language. So we went through Moscow, I reading the street names or the menus in restaurants, and he understanding the meaning, a benign version of the fable of the blind and the lame.

I shall refrain from further anecdotes, but should like to insist on the lesson he taught us throughout his life. The lesson is that time is short, we have to make the best of it; enjoy life in all aspects, family, friends, sciences, applications, travel, and so on. We should remember that, as we are too often thinking in a sequential way, postponing so many things. But of course we are not Moshé... Finally, a regret for me, he did not become my brother in law – but maybe it was better for him!

* * *

Alan Weinstein, University of California, Berkeley

Before introducing the next lecture, I would like say a few words about an aspect of Moshé's talents which has not yet come up in the preceding tributes. I refer to something related to his acting skills, which have already been mentioned, namely has ability as an artists' model.

Visitors to Moshé's apartment were treated to, among many other delights, a collection of portraits of Moshé done by a variety of artists working in many media. When Moshé and Daniel visited Berkeley several years ago, Moshé saw some of my wife Margo's photographs taken through melting ice on sheets of glass and asked if he could be the subject for such photographs. You can see the results yourselves in the lobby of this conference center. Moshé took to the portrait sitting with gusto, going through a wide variety of poses, some of them worthy of the kabuki actors he so enjoyed. Margo found him to be one of the most interesting subjects she has ever photographed.

When, shortly after Moshé passed away, Daniel asked Margo to make a new set of prints of Moshé's portraits, she agreed of course, but found the printing job to be emotionally wrenching. As the portrait appeared in the developer tray (the reader can see it emerging at the website http://www.math.berkeley.edu/˜alanw/moshe.html), Moshé appeared to be waving goodbye from "the other side."

Our next speaker, Simone Gutt, has been closely associated with Moshé since her student days, when he was a member of her doctoral thesis committee. Over the years, she and her collaborators have made a series of fundamental contributions to the subject of deformation quantization. It is therefore most appropriate that she will speak at this Conference on "Variations on Deformation Quantization".

Yvette Kosmann-Schwarzbach, École Polytechnique

What comes first to mind, now that the initial shock of Moshé's sudden illness and death has passed, is his forceful character, directness, and the warmth of his friendship. As so many of his friends have mentioned already, he had a special affection for children, enquiring about the progress that each of ours was making in school, in music, and in life. I shall not forget my conversations with him during the intermissions of the CNU session of the Spring of 1997, when our daughter was hospitalized. He was able to encourage me because I felt that he truly cared for her, as he did for the children of all his colleagues and friends.

Such was the vigor of his character that his really important achievements as a scientist only come to mind in second place. I need not repeat what others have said and written about them. His œuvre will remain. The creation of *Letters in Mathematical Physics* focused the energies of the mathematical community and contributed in an essential way to the development of an important field of science. Deformation quantization was the brainchild of Moshé and his collaborators, François Bayen, Chris Frønsdal, André Lichnerowicz, and Daniel Sternheimer.

Daniel, Chris, and so many others are even now working on developments of deformation theory, while Daniel is keeping Moshé's institutional and scientific legacy alive with indefatigable zeal and success. But André Lichnerowicz died two weeks after Moshé. Moshé was my contemporary, but Lichnerowicz was my master, and I miss both of them, enormously. For me, the most moving moment of the opening ceremony of this Conference was the evocation by Dr. Jérôme Lichnerowicz of their mathematical collaboration and the deep friendship that united them.

What can I add to the tribute already paid to Moshé by mathematicians and physicists better qualified than myself? The fact that so many of them travelled from the ends of the world to attend this Conference, to make it a meeting that Moshé would have enjoyed, is proof that Moshé's spirit is still alive among us and as driving force in the scientific community.

* * *

Robert Finkelstein, UCLA

I first met Moshé in the early 70's when he, Daniel, and Jacques began to visit Chris Frønsdal at UCLA. In those days Moshé and his collaborators were engaged in their pioneering studies of deformation theory.

Although we were of different generations, Moshé and I had remotely similar academic backgrounds. He, as a student of Racah, and I as a student of van Vleck were naturally interested in the application of group theory to quantum mechanics. However, by the time we had met, Moshé had become a mathematical physicist with a capital M and I had remained a physicist. Still, our tastes and attitudes toward the problems of fundamental physics had much in common.

The principal connection between us did not, however, grow out of our common scientific interests. There was rather a long personal friendship. With his high spirits and straight-forward frank way of speaking, it was always a great pleasure for me to be with him, even when we disagreed — as we frequently did.

Moshé's grand style, his superb hospitality, his concern for others, and his capability to reach out to all manner of people were qualities that we all knew. He took a personal interest not just in the promising students. There seemed to be no one who crossed his path whom he would not try to help and no troubled social situation that he would not try to ameliorate. (As a result he knew more local gossip at UCLA than I knew myself.) He was a kind of universal entrepreneurial activist in the best sense of the word.

My wife, Norma, and I spent a week with Moshé and Daniel about two months before his fatal stroke. We had no knowledge of the medical episode in St. Petersburg or the reports of his subsequent depression. We were with him every evening and there was no indication to us that there was anything wrong. He was the same wonderful exuberant Moshé that we had always known and that is how we would like to remember him.

* * *

Murray Gerstenhaber, University of Pennsylvania

Sadly I knew Moshé for too short a time. Although I am ten years older, I felt that I was his disciple, for I quickly saw that I was in the presence of a great teacher. My name is really also Moshe, so I often signed my email messages "Moshe2". I hope that Moshe1 recognized the tribute.

Since our next speaker, Alain Connes, has referred to Moshé as a "mathematician rabbi", I want to tell a talmudic tale that illustrates one aspect of Moshé's intellectual make-up. I am sure that Moshé knew it. Rabbi Eliezer was arguing a point of law with his fellow rabbis and said, If I am right this carob tree will prove it. The tree was uprooted 150 feet, but the other rabbis said, We don't accept proofs from trees. So Rabbi Eliezer said, If the law is with me this stream will prove it. The water began to flow backwards but the others said, We don't bring proofs from streams of water. So Eliezer said, If I am right the walls will prove it. They lean to this day, but the others still rejected Rabbi Eliezer's position. Finally he said, Let the heavens prove it, and a voice said, Eliezer is right, why do you trouble him? But the other rabbis said that their reason outweighed heavenly proofs, and being in the majority, they excommunicated him. Like Eliezer, Moshé was usually stubbornly right, but never in the majority. Our next speaker, like Moshé, has had to overcome a hostile establishment which, however, ultimately recognized the power of his proofs.

Piotr Rączka, Warsaw University

I am speaking here for the whole Rączka family, and first of all for my father, Ryszard Rączka, who has known Moshé Flato for more than thirty years. My father met Moshé for the first time in mid-sixties in Trieste. At that time they were both deeply interested in mathematical aspects of theoretical physics. Their professional contacts quickly evolved into what became a lifelong friendship. It is fair to say that Moshé was one of the closest friends of my father. My father greatly appreciated Moshé's bold and sometimes highly critical scientific opinions, his energetic personality and a unique sense of humour. Looking back at these years one can also clearly see that interaction with Moshé played a vital role in my father's life. In these years the research in mathematical physics was not always popular in the physics community – encouragment and support from Moshé and his enthusiasm for beautiful mathematics were certainly very important for the development of my father's career as a mathematically minded theoretical physicist. The contacts acquired through Moshé and frequent visits to France on Moshé's invitation were also of great value to him.

Also for the rest of us – that is, for my mother, my siblings and myself – Moshé was someone special. He was always interested in our lives and remembered very well all the important facts about us. My mother recalls that talking to him about herself and her family was like talking to a close relative, who understands completely your way of life and your problems – something quite extraordinary, taking into account number of people with whom Moshé interacted and the fact that we did not meet very often. We all visited him in Paris one time or another and benefited from his warm hospitality there. Moshé's presence could be felt in so many moments of our lives that we treated him almost as a member of our family.

Moshé was always deeply moved by the problems of his friends and showed great compassion for people close to him. We could experience that ourselves. During the last couple years we went through some difficult times. What we received during that period from Moshé and Daniel went way beyond what we received from anyone else. Moshé and Daniel paid a special short visit to Poland right after the death of my father to comfort my mother and – despite the fact that Moshé's health was clearly deteriorating – they later came again twice to attend two conferences organized in Poland to honour the memory of my father. Moshé greatly contributed to the organization of these conferences.

We are grateful to Moshé for all he has done for us. We treated him as a member of our family, and we mourn for him as for a family member.

Hideki Omori, Science University of Tokyo, Noda

My colleagues and I came to know the name Moshé Flato from the famous paper [1] that first fixed the notion of deformation quantization. At that time in Japan, the notion of quantization was not a so familiar one for mathematicians.

We were working on groups generated by invertible Fourier integral operators on manifolds by which we wanted to treat wave equations on manifolds, just as in the history of early quantum theory in physics. We were interested in the asymptotic geometry of Maslov [2].

However, as every quantum physicist believes, maybe from a philosophical point of view, the Heisenberg picture and the Schrödinger picture are equivalent. Hence, the asymptotic geometry of Maslov and the notion of deformation quantization seem, for our simple mind, to give at least the same predictions.

Influenced by these great ideas, we have started in Japan to study the theory of deformation quantization, that is, star-products. The notion of deformation quantization does not require representation theory, we can merely start from a phase space: a symplectic manifold, or more generally, a Poisson manifold.

After that, Moshé and Daniel have visited our university several times to impulse and stimulate our study. During each visit, they encouraged us warmly just like elder brothers, but that was hard too sometimes.

Being free from representation theory looks like a significant advantage for the construction of the general theory of quantization. But from the very beginning of deformation theory, there was a deep question: Is every Poisson manifold deformation quantizable?

Suppose there were a Poisson manifold which is not deformation quantizable. How does a quantum physicist, who insists that the true nature of the world is given by quantum theory, and the Poisson structure is only its first approximation, explain such an object? If there were such an object, the theory of deformation quantization would meet a philosophical difficulty.

Now, it is my great pleasure, and probably Moshé would have the same thought, to introduce to the audience Professor Maxim Kontsevich, who proved that every Poisson manifold is formally (i.e, treating $\hbar$ as a formal parameter) deformation quantizable. By his theorem, we can avoid the above-mentioned philosophical crisis.

The theory of deformation quantization is celebrated and we are now at the beginning of a second generation. In this second stage, $\hbar$ will no more a formal parameter, but a positive small number.

[1] Bayen, F., Flato, M., Fronsdal, C., Lichnerowicz, A., and Sternheimer, D.: Deformation theory and quantization I, II, *Ann. Physics* **111** (1978), 61–110, 111–151.

[2] Karasëv, M. V. and Maslov, V. P.: Asymptotic and geometric quantization, *Russian Math. Surveys* **39** (1984), 133–205.

Nicolai Reshetikhin, University of California, Berkeley

The next speaker does not need an introduction. The name of Bert Kostant is now part of the Lie theory. He was also a great friend of Moshé.

So many good words have already been said about Moshé that it is hard to add something new. The first time I met Moshé goes back to the earlier 80's in Leningrad, when he was one of (relatively few) visitors from the other side of the Iron Curtain. He has impressed me as an independent, opinionated, but at the same time very kind, person. He was very friendly with young people and at that time this was very important for me and, I believe, to others of my age. This allowed us to make the connection with the older generation in a natural and friendly way. It filled the generation gap. This was the beginning of our friendship. It was very interesting to argue with Moshé. I could not always agree with him, but that was making the conversation even more interesting. I will miss Moshé, I will miss discussions with him, when everything was questioned from mathematics and physics to politics and history. I am very happy that I had such a friend.

* * *

Ivan Todorov, Sofia

Moshé at seminars

Moshé and I first saw each other over 30 years ago in Trieste. We kept meeting at conferences in various places in the subsequent decade but it was not until we got together in Istanbul (at the Bogazici University) in 1979 that we became friends. (My next visit to Istanbul – alas, without Moshé – took place only this summer: We arrived on August 16, just in time for the earthquake!) No need for an earthquake was felt 20 years ago: there was Moshé Flato to shake us at every session of the Conference. He stormed discussions in (what I later came to know as) his usual manner, attacking speakers and vocal participants alike, in particular those displaying an excessive self-confidence. We got a good fight there more than once. Moshé, of course, put me down when I ventured to intervene at a talk on deformation quantization but he seemed to appreciate my resistence in a few other cases of disagreement. After one of these public fights he apparently thought that I was ripe to visit Dijon for a month, so he invited me for next year.

Moshé's seminars in Dijon used to be rather picturesque. Dijon time in those days did not run according to clock; a loud voice was needed to announce the beginning: "Séminaire!". You could not fall asleep at a seminar. No matter who the speaker was, he would be interupted and challenged by Moshé before long. Sometimes this could be irritating and a new visitor could get upset; but he was soon to realize that the attacks were not malicious, they rather served to keep the audience alert. In case you were an habitué you were discouraged in advance to make unsubstantiated claims.

Moshé loved intellectual fights just as he liked good meals – and often combined the two. Given his generosity and compassion for people – that were stressed here repeatedly (and to which my family and I can testify) it is not surprising that Moshé has so many friends. It may appear less obvious, however, if you remember that he seemed to be looking for confrontations rather than diplomatically avoiding them. I believe that this may actually account for the quality of Moshé's friends. Is not it wonderful that a gathering of just friends of Moshé Flato as this one is becoming a most remarkable meeting on mathematical physics in years?

Well, it is time to give the word to Maxim Kontsevich who, for his second lecture here, will speak on the "Proof of Deligne conjecture". Maxim, I am sorry, I am not Moshé Flato to stop you during your talk. So, please, slow down yourself to make it easier for us to follow.

* * *

Boris Fedosov, Moscow and Potsdam

Moshé Flato as I remember him

I knew Moshé Flato not as long as most of the previous speakers but like all of them I was greatly impressed by his exceptional personality. I am very proud that in spite of a rather short period of our acquaintance he named me his friend.

Our first meeting really overwhelmed me. I vividly remember the day when I came to Dijon to talk at a seminar. It began at the restaurant at the Dijon station where I was invited for lunch by a telephone call from Paris. Moshé's energy and outstanding personality produced an unforgettable impression upon me from the moment I saw him. During the lunch he acquainted me with French cuisine and discussed many things: mathematics, politics, art and music. He proved to know the events in my country better than me! The lunch lasted rather long and it was an event. Meals according to Moshé were things to enjoy. I remember him saying: "I can't understand some American friends of mine who, looking at the watch say: 'I still have 5 minutes before my lecture to have a sandwich and a cup of coffee' ". Moshé said: "You better go to the lecture hungry but after it relax and have good dinner."

Then there was a seminar where I talked on deformation quantization. It sounded rather funny that I, a newcomer, who came to deformation quantization from partial differential equations and index theory, tried to "teach" an outstanding specialist in this field. Nothing surprising that at first I was treated by Moshé as an intruder. During my talk and after it there were many critical remarks from both Moshé and Daniel, which in the long run proved to be very valuable to me.

In the evening a famous Thursday dinner took place at a Dijon restaurant. We parted late at night at the hotel. I was completely exhausted, but not Moshé. I already felt that I parted from a good friend. And indeed, later on I felt not only his friendly attitude towards me and my wife but also a desire and readiness to help. Now, when he has left us, I still feel his friendly hand.