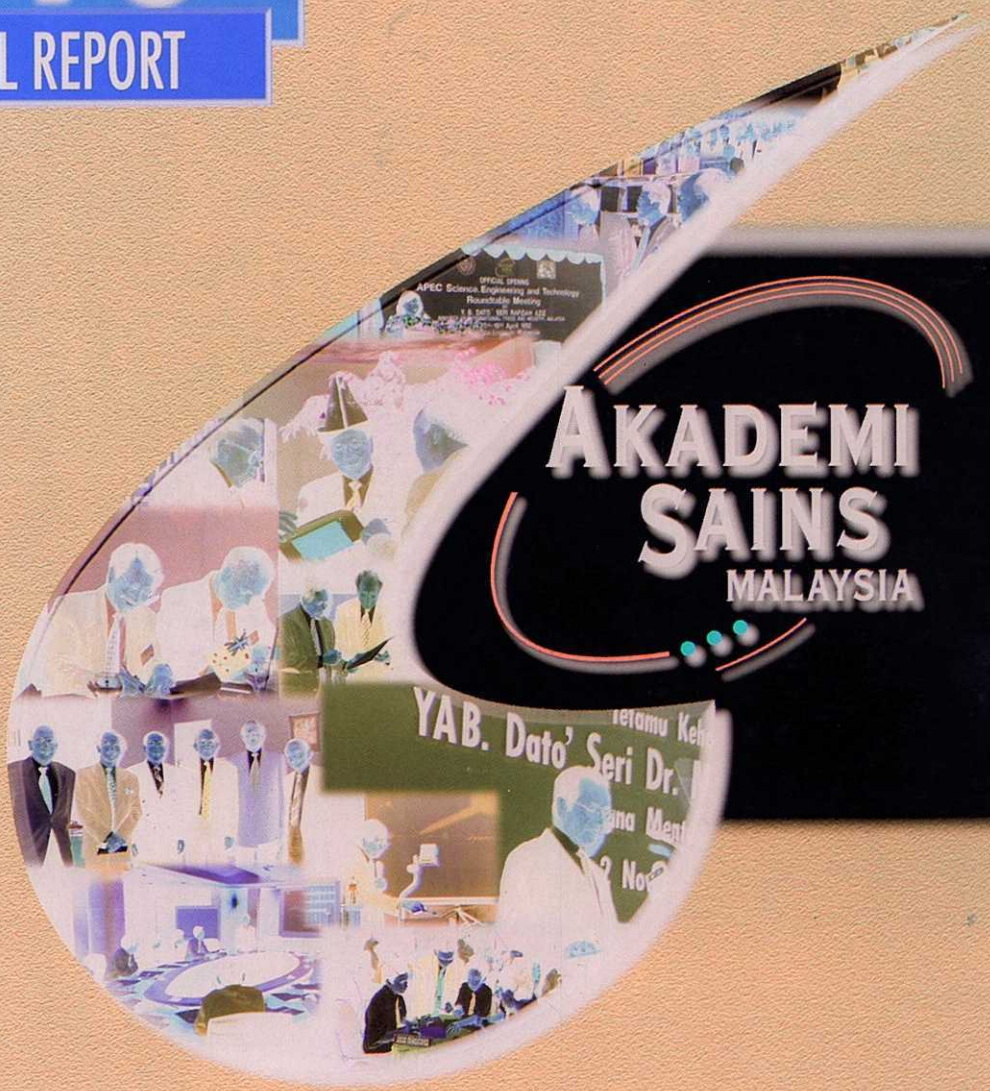
LAPORAN TAHUNAN 1998
ANNUAL REPORT



AKADEMI SAINS MALAYSIA

AKADEMI
SAINS
MALAYSIA

Pernyataan Misi

..... mencapai, menggalak, serta meningkat kecemerlangan dalam bidang sains, kejuruteraan dan teknologi khusus untuk kemajuan dan pembangunan negara dan juga untuk kebaikan manusia sejagat

Mission Statement

..... the pursuit, encouragement and enhancement of excellence in the fields of science, engineering and technology, for the development of the nation and the benefit of mankind

Akademi Sains Malaysia

Laporan Tahunan

1998

Annual Report

Academy of Sciences Malaysia

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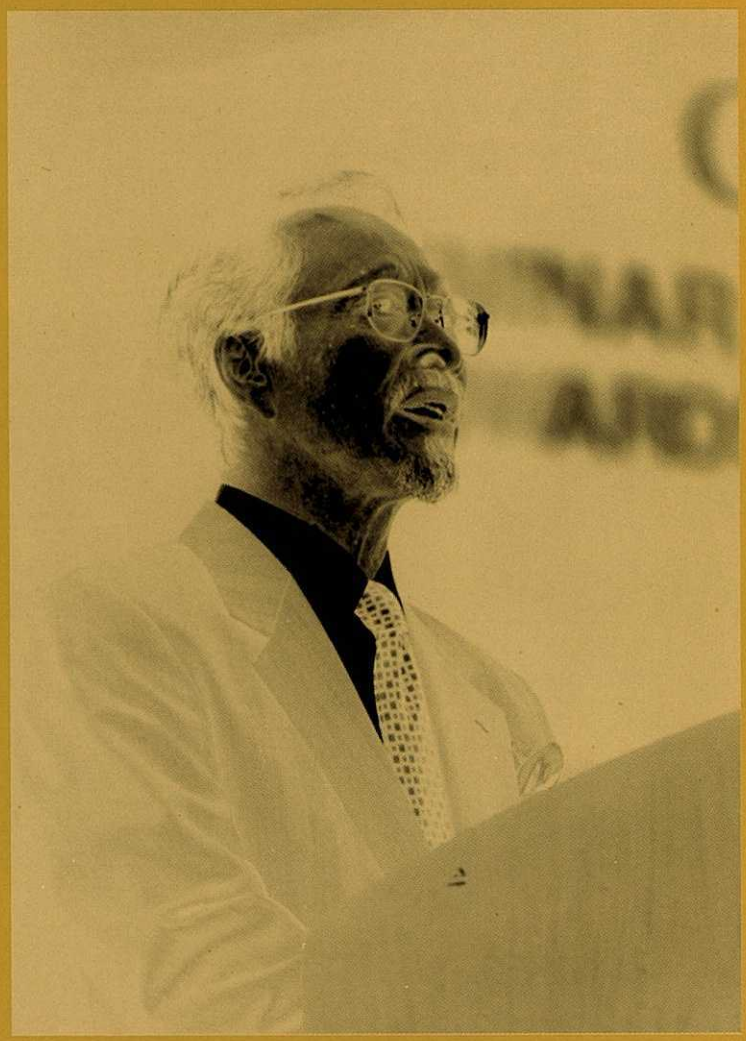


Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc.

LAPORAN PRESIDEN
PRESIDENT'S REPORT

Saya dengan sukacitanya melaporkan perkembangan dan kemajuan Akademi tahun ini. Tahun ini merupakan tahun yang cemerlang, dan ia telah dicapai melalui dedikasi fellow dan kakitangan.

Sepanjang tahun penilaian ini, Akademi meneruskan aktiviti-aktiviti berlandaskan kepada lima bidang utama.

Mesyuarat Agung Tahunan Ketiga Akademi telah diadakan pada 25 April 1998. Mesyuarat telah meluluskan pemilihan tujuh orang Fellow baru dan enam orang Ahli Majlis.

Izinkan saya untuk melaporkan beberapa pencapaian utama pada tahun 1998. Akademi telah berjaya menganjurkan Persidangan Meja Bulat Sains, Kejuruteraan dan Teknologi (SET) APEC untuk membincangkan Agenda APEC dalam S&T dan Kerjasama Industri Kearah Abad ke 21. Lebihkurang 56 peserta dari 17 ahli ekonomi APEC menghadiri mesyuarat ini. Satu deklarasi dan laporan mesyuarat meja bulat ini telah dihantar kepada Menteri Perusahaan Antarabangsa dan Industri untuk dimasukkan ke dalam Agenda APEC. Agenda APEC dalam bidang S&T dan Kerjasama Industri telah diluluskan di Mesyuarat Ketua Ekonomi Negara APEC di Kuala Lumpur, November 1998.

I am pleased to report another year of sound progress for the Academy. It had been a successful year, made possible through the dedication of the fellows and the staff.

During the year under review, the Academy continued to carry out its activities which are based on the five thrust areas.

The Academy's Third Annual General Meeting was held on 25th April 1998. The meeting approved the election of seven new Fellows and six new members of the Council.

Permit me to highlight some of our major achievements in 1998. The Academy has successfully concluded an APEC SET Roundtable Meeting to discuss the APEC Agenda for S&T Industry Co-operation into the 21st Century. Some 56 participants from 17 APEC economies attended and participated in the meeting. A declaration of the roundtable has been forwarded to the Minister of International Trade and Industry for inclusion into the APEC Agenda. The APEC Agenda for S&T Industry Co-operation was approved by the APEC Economic Leaders Meeting in Kuala Lumpur, November 1998.

Akademi telah menganjurkan Siri Syarahan ASM dengan kerjasama PETRONAS melalui PETROSAINS - sebuah subsidiari PETRONAS. Syarahan PETROSAINS-ASM 1998 telah dilancarkan dengan jayanya oleh Timbalan Menteri Pendidikan, YB Dato' Khalid Yunus pada 6 Oktober 1998. Fasa 1 Syarahan meliputi kawasan Kuala Lumpur, Shah Alam, Seremban, Ipoh, Johor dan Melaka dan selesai pada bulan Oktober 1998 serta menerima maklum balas yang sangat baik dari guru-guru dan pelajar-pelajar. Fasa II Syarahan ini akan bermula pada bulan Mei 1999.

The Academy has initiated the ASM Lecture Series in collaboration with PETRONAS through PETROSAINS – a subsidiary of PETRONAS. The PETROSAINS-ASM 1998 Lecture was successfully launched by the Deputy Minister of Education, YB Dato' Khalid Yunus on the 6th October 1998. Phase I of the Lecture which covered Kuala Lumpur, Shah Alam, Seremban, Ipoh, Johor and Melaka was completed in October 1998 and received overwhelming response from the teachers and students. The Phase II of the Lecture will begin in May 1999.

Bagi membolehkan Akademi memberi nasihat kepada Kerajaan dengan lebih berkesan, Menteri Sains, Teknologi dan Alam Sekitar serta Ketua Setiausaha Negara bersetuju untuk mengadakan Dialog/ Forum dengan Akademi dari masa ke semasa. Ini bertujuan untuk memudahkan penyaluran input/ cadangan kepada pihak Kerajaan dengan cara yang lebih berkesan.

To enable the Academy to give advice effectively to the Government, the Minister of Science, Technology and the Environment and the Chief Secretary to the Government agreed to have a Dialogue/Forum with the Academy from time to time. This is to make sure the input/ recommendation, to the Government could be channelled effectively.

Salah satu peranan Akademi adalah untuk menyalurkan nasihat kepada Kerajaan mengenai perkara yang berkaitan dengan sains, kejuruteraan dan teknologi. Untuk menjayakan peranan ini Akademi telah menyerahkan dua laporan kepada pihak Kerajaan.

One of the main roles of the Academy is to provide independent advice to the Government on matters related to science, engineering and technology. In fulfilling this role, the Academy had

Satu, adalah laporan kajian mengenai *"Pengurusan Sumber Asli Malaysia: Suatu Pendekatan Bersepadu"*. Laporan ini telah diserahkan kepada YB Datuk Law Hieng Ding, Menteri Sains, Teknologi dan Alam Sekitar. Laporan ini juga telah diserahkan kepada Majlis Perancangan Pembangunan Nasional (MPPN) dan juga kepada Unit Implementasi dan Koordinasi (ICU) di Jabatan Perdana Menteri. Akademi juga menyiapkan satu laporan khas kepada Kerajaan bertajuk *"Krisis Air: Keperluan Ke arah Pengurusan Sumber Air Secara Bersepadu di Malaysia"*. Akademi telah menyarankan beberapa cadangan untuk dipertimbangkan oleh pihak Kerajaan mengenai cara bagaimana untuk mengatasi krisis air melalui pendekatan pengurusan sumber air secara bersepadu. Satu lagi laporan mengenai *"Designing Science Education for Competitiveness: Recommendations on Measures to Increase Student Enrolment in Science in Malaysia"* yang telah disiapkan pada tahun 1998 dan akan diserahkan kepada Menteri Pendidikan pada tahun 1999.

Di bawah Program Budaya Kecemerlangan yang mana bertujuan untuk membentuk budaya kecemerlangan dalam bidang sains, kejuruteraan dan teknologi, Akademi telah mengadakan Syarahan Perdana

presented two reports to the Government. One is the study report on "Malaysia's Natural Resources Management : An Integrated Approach". This report was presented to the YB Datuk Law Hieng Ding, Minister of Science, Technology and the Environment. Subsequently the report was forwarded to the National Development Planning Council (NDPC) and also to the Implementation and Co-ordination Unit (ICU) of the Prime Minister's Department. The Academy had also prepared a special report to the Government entitled "The Water Crisis : A Compelling Case for Integrated Water Resources Management in Malaysia". The Academy put forward recommendations for consideration of the Government on how to overcome the water crisis through an integrated water resources management approach. Another report on "Designing Science Education for Competitiveness : Recommendations on Measures to Increase Student Enrolment in Science in Malaysia" was completed in 1998 and will be presented to the Minister of Education in 1999.

Under the Culture of Excellence Programme which is aimed to inculcate a culture of excellence in

1998. Tajuk Syarahan Perdana adalah *"Recent Development in Vibrational Spectroscopy of Ionic Clusters"* yang telah disampaikan oleh Prof Lee Yuan Tseh, Presiden Academia Sinica Taiwan dan Nobel Laureate dalam bidang Kimia pada tahun 1986.

Sehubungan dengan program ini, Akademi dengan kerjasama Universiti Malaya telah menganjurkan Syarahan Umum bertajuk *"The Impact of Understanding Chemical Reaction Mechanism to Our Living Environment"* yang juga disampaikan oleh Prof Lee Yuan Tseh. Syarahan ini membincangkan mengenai reaksi dinamik kimia yang menarik, mengunakan *beam* molekular dan teknik lazer serta implikasi kajian ini kepada kefahaman mengenai persekitaran kimia, terutamanya masalah yang berkaitan dengan pengurangan ozon.

Di bawah program yang sama Akademi dan Jawatankuasa Khas Sains dan Teknologi Majlis Organisasi Wanita Kebangsaan (NCWO) bersama-sama menganjurkan forum mengenai *"Peranan Saintis di Malaysia – Ke Arah Kecemerlangan Penyelidikan"*. Forum ini membincangkan faktor-faktor bagaimana untuk mencapai kecemerlangan dan faktor-faktor yang boleh memotivasikan saintis untuk mencapai kecemerlangan di dalam penyelidikan. Hasil dari forum

the fields of science, engineering and technology, the Academy held its 1998 Annual Oration. The Oration entitled "Recent Development in Vibrational Spectroscopy of Ionic Clusters" was delivered by Prof Lee Yuan Tseh, President Academia Sinica Taiwan and Nobel Laureate in Chemistry in 1986.

In connection with the Oration, the Academy in collaboration with University of Malaya organized the ASM Public Lecture entitled "The Impact of Understanding Chemical Reaction Mechanism to Our Living Environment" which was also delivered by Prof Lee Yuan Tseh. The lecture discussed the exciting field of chemical reaction dynamic using molecular beam and laser techniques and the implications of these studies to the understanding of atmospheric chemistry, especially problems related to ozone depletion.

Under the same broad programme, the Academy and the Science and Technology Commission of the National Council of Women Organizations (NCWO) jointly organized a forum on "The Role of Scientists in Malaysia – Towards Excellence in Research". The forum discussed the factors on how to achieve excellence and factors that motivate scientists to attain

ini akan digunakan oleh Akademi sebagai input untuk membentuk kertas cadangan mengenai langkah-langkah bagi mencapai kecemerlangan dalam bidang sains, kejuruteraan dan teknologi.

Pada 16 Julai 1998 Tabung Penyelidikan Perubatan Dr Ranjeet Bhagwan Singh dan Pelancaran Syarahan Peringatan telah dirasmikan oleh YB Datuk Law Hieng Ding, Menteri Sains, Teknologi dan Alam Sekitar, Malaysia di Institut Penyelidikan Perubatan (IMR). Pemenang geran penyelidikan perubatan bagi tahun 1998 adalah Cik Lian Lay Hong dan Prof Madya Dr Hoh Hon Bing dari Universiti Malaya. Syarahan Peringatan bertajuk *"Millennial Challenges in Communicable Disease Control"* telah disampaikan oleh Prof Emeritus Sir Gustav Nossal, Bekas Presiden, *Australian Academy of Science.* Beliau juga menyampaikan Syarahan Umum bertajuk *"New Frontiers in Science and Medicine"* di Perdanasiswa, Universiti Malaya yang telah dianjurkan oleh Akademi dan Universiti.

Sejajar dengan itu Akademi juga telah menganjurkan *Back to School Lecture* di atas tajuk *"Cancer and Immortality"* dan Syarahan Umum mengenai *"Antartika – Benua Ke Enam"* di bawah Program Kesedaran Sains.

excellence in research. The output from the forum will be used by the Academy as input to develop a proposal on how to achieve excellence in SET.

On 16th July 1998 the Dr Ranjeet Bhagwan Singh Medical Research Fund and the Inaugural Memorial Lecture were officially launched by YB Datuk Law Hieng Ding, Minister of Science, Technology and the Environment, Malaysia at the Institute for Medical Research (IMR). The recipients of the medical research grants in 1998 were Ms Lian Lay Hong and Assoc. Prof Dr Hoh Hin Bing from University of Malaya. The Memorial Lecture entitled "Millennial Challenges in Communicable Disease Control" was delivered by Prof Emeritus Sir Gustav Nossal, Past President of the Australian Academy of Science. He also delivered a Public Lecture entitled "New Frontiers in Science and Medicine" at Perdanasiswa, University of Malaya which was organized by the Academy and the University.

In addition the Academy had also organized a Back to School Lecture on "Cancer and Immortality" and a Public Lecture on "Antarctica – The Sixth Continent" under its Science Awareness Programme.

Kementerian Sains, Teknologi dan Alam Sekitar (KSTAS) menubuhkan Jawatankuasa Petugas di ketuai oleh Dato' Dr Salleh Mohd Noor F.A.Sc. untuk menyediakan satu kertas cadangan mengenai Program Penyelidikan dan Pembangunan (P&P) Malaysia di Antartika. Jawatankuasa Bertindak menyerahkan kepada KSTAS kertas konsep mengenai Program Penyelidikan Malaysia di Antartika. Sebagai langkah merealisasikan matlamat untuk menghantar saintis Malaysia ke Antartika, Akademi telah menganjurkan bengkel tiga hari bermula daripada 28 hingga 30 Oktober 1998 dengan matlamat utama untuk meneliti dan memastikan fokus cadangan penyelidikan Malaysia sejajar dengan penyelidikan terkini yang sedang dijalankan di Antartika. Sesi panel diskusi setengah hari bertajuk *"Penyelidikan Saintifik di Antartika: Cabaran dan Peluang"* juga telah diadakan pada sebelah pagi 28 Oktober 1998. Hasil daripada bengkel ini, Akademi telah menyerahkan laporan yang mengandungi cadangan mengenai Program Penyelidikan Malaysia di Antartika kepada KSTAS. Akademi juga membiayai lawatan pengenalan dan penyesuaian untuk Prof Madya Dr Azizah Abu Samah, Ketua Jabatan Geografi, Universiti Malaya ke Antartika bermula dari 11 - 22 Oktober 1998. Matlamat

The Ministry of Science, Technology and the Environment (MOSTE) set up a Task Torce headed by Dato' Dr Salleh Mohd Nor F.A.Sc. to come up with a proposal on Malaysian Research and Development (R&D) programmes in Antarctica. The Task Force submitted to MOSTE a concept paper on the Malaysian Antarctica Research Programme. As a step closer towards realising the goal of sending Malaysian scientists to the Antarctica, the Academy organized a three day workshop from 28th to 30th October 1998 with the primary objective to refine and refocus the Malaysian research proposal to the current research interest in Antarctica. A half-day panel discussion on "Scientific Research in Antarctica : Challenges and Opportunities" was also held on the morning of 28th October 1998. Following this workshop, the Academy submitted a report to MOSTE containing the recommendations on the Malaysian Research Programme in Antarctica. The Academy also sponsored Assoc. Prof Dr Azizan Abu Samah, Head of Geography Department, University of Malaya for a familiarization trip to Antarctica from 11th to 22nd October 1998. The objective of the trip was to enable Dr Azizan to experience

utama lawatan ini adalah untuk membolehkan Dr Azizan menimba pengalaman dan mempelajari suasana kerja di Antartika yang mana ianya sangat berguna untuk saintis Malaysia agar lebih bersedia dari segi mental dan fizikal bagi mengendalikan aktiviti penyelidikan di Antartika.

Pada tahun 1998 Akademi juga telah melawat Kementerian Sains, Teknologi dan Alam Sekitar, Vietnam. Tujuannya adalah membincangkan cadangan Mesyuarat Tahunan Akademi Sains, Kejuruteraan dan Teknologi dan Organisasi yang Serupa daripada ASEAN dan Rakan Dialog ASEAN 1998. Akademi juga meneruskan lawatan ke beberapa organisasi dan institut penyelidikan tempatan. Pada tahun ini Akademi telah melawat PORIM, MIMOS dan MDC.

Akademi juga berpeluang untuk menjadi hos kepada beberapa pelawat penting sepanjang tahun. Antara mereka adalah Prof Juhani Ahava, Pengerusi *Finnish Academy of Technology,* Prof Emeritus Sir Gustav Nossal, Bekas Presiden, *Australian Academy of Science,* Prof Madya Dr Bing Lim dari *Harvard Medical School,* Prof Atta-Ur-Rahman, *Co-ordinator General OIC Standing Committee in Scientific and Technological Co-operation (COMSTECH), dua*

and study the extreme working conditions in the Antractica which will be useful for Malaysian scientists to be physically and mentally more prepared to undertake research activities in the Antarctica.

In 1998 the Academy visited the Ministry of Science, Technology and the Environment, Vietnam and National Centre for Natural Sciences and Technology, Vietnam. The purpose was to discuss the proposed 1998 Annual Meeting of Academies of Science, Engineering and Technology and Similar Organizations from ASEAN and ASEAN Dialogue Partners. The Academy also continued its familiarisation visits to various local organizations and research institutions. This year the Academy visited PORIM, MIMOS and MDC.

The Academy also had the privilege to host many important visitors throughout the year. Among them were Prof Juhani Ahava, Chairman of Finnish Academy of Technology, Prof Emeritus Sir Gustav Nossal, Past President Australian Academy of Science, Assoc. Prof Dr Bing Lim of Harvard Medical School, Prof Atta-Ur-Rahman, Co-ordinator General OIC Standing Committee in Scientific and Technological Co-operation (COMSTECH), two delegations from the National Centre for Natural Science and

delegasi dari National Centre for Natural Science and Technology, Vietnam dan TYT Academician Prof Janybek Jaenbayev, Presiden, *National Academy of Science of the Kyrgyz Republic.*

Fellow Akademi telah melibatkan diri secara aktif dalam banyak aktiviti antarabangsa sepanjang tahun. Datuk Dr Yusof Basiron F.A.Sc. telah *menghadiri "Asia-Pacific High Level Conference on Sustainable Agriculture"* di Beijing dan beliau telah membentangkan kertas kerja bertajuk *"Sustaining Agricultural Development in Malaysia : Experience in the Plantation Sector"* yang telah disediakan bersama oleh Datuk Dr Abdul Aziz S.A. Kadir F.A.Sc.. Dato' Ir Lee Yee Cheong F.A.Sc., Setiausaha Agung Akademi telah menghadiri mesyuarat *Inter Academy Panel* (IAP) dan *Sustainability Transition Co-ordinating Committee* (STCC) di Trinidad dan Tobago. Beliau juga dijemput ke Persidangan Sains UNESCO Asia-Pacific bertemakan *"Science Issues for the 21st Century"* di Sydney, Australia di mana beliau telah menyampaikan ucapan latar di Majlis Perasmian dengan *tajuk "Alternatives Futures for Science, Engineering and Technology in the Asia-Pacific Region in the 21st Century"*. Mesyuarat Tahunan Akademi SET ASEAN dan

Technology, Vietnam and H.E Academician Prof Janybek Jaenbayev, President National Academy of Sciences of the Kyrgyz Republic.

The Fellows of the Academy have been actively involved in many international activities throughout the year. Datuk Dr Yusof Basiron F.A.Sc. attended the "Asia-Pacific High-Level Conference on Sustainable Agriculture" in Beijing and he presented a paper entitled "Sustaining Agricultural Development in Malaysia : Experience in the Plantation Sector" which was jointly authored with Datuk Dr Abdul Aziz S.A. Kadir F.A.Sc.. Dato' Ir Lee Yee Cheong F.A.Sc., Secretary General of the Academy attended the Inter Academy Panel (IAP) and Sustainability Transition Co-ordinating Committee (STCC) meetings in Trinidad and Tobago. He also attended the UNESCO Asia-Pacific Science Conference themed "Science Issues for the 21st Century" in Sydney, Australia where he gave the scene-setting address at the opening reception entitled "Alternatives Futures for Science, Engineering and Technology in the Asia-Pacific Region in the 21st Century". The 1998 Annual Meeting of ASEAN SET Academies and Similar National Organizations and

Organisasi National Seumpamanya serta rakan dialog ASEAN dari Australia, Jepun, Korea Selatan dan New Zealand di Hanoi telah dianjurkan bersama oleh Akademi dan dihadiri oleh Dr M.K. Rajakumar F.A.Sc., Timbalan Presiden Akademi dan Dato' Ir Lee Yee Cheong F.A.Sc., Setiausaha Agung Akademi. Presiden Akademi Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. telah menghadiri Mesyuarat Agung Tahunan *Australian Academy of Technological Science and Engineering* (ATSE), Seminar ATSE bertemakan *"Schooling in Science and Technology : Is there a case of neglect"* dan Simposium ATSE mengenai *"Technology - Australia's Future : New Technology for Traditional Industry"* di Perth Australian Selatan. Beliau juga telah menandatangani Perjanjian Kerjasama dengan *Australian Academy of Science* dan *Australian Academy of Technological Sciences and Engineering.*

Dialogue Partners from Australia, Japan, South Korea and New Zealand in Hanoi was co-organised by the Academy and attended by Dr M.K. Rajakumar F.A.Sc., Vice President of the Academy and Dato' Ir Lee Yee Cheong F.A.Sc.. Secretary General. The Academy's President Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. attended the Annual General Meeting of the Australian Academy of Technological Sciences and Engineering (ATSE) and ATSE Fellows Seminar themed "Schooling in Science and Technology : Is there a case of neglect" and the ATSE Symposium "Technology – Australia's Future : New Technology for Traditional Industry" in Perth, Western Australia. He also signed a Co-operation Agreement with the Australian Academy of Science and the Australian Academy of Technological Sciences and Engineering.

Sepanjang tahun Akademi telah menerbitkan bahan-bahan berikut:

1. Laporan Tahunan ASM 1998
2. Laporan mengenai *"Seminar on ASEAN S & T Vision : Towards Technologically Competent ASEAN"*

During the year the Academy published the following :

1. *1998 ASM Annual Report*
2. *A Report On "Seminar On Asean S&T Vision : Towards Technologically Competent Asean"*

3. Prosiding mengenai *"Seminar on ASEAN S & T Vision : Towards Technologically Competent ASEAN"*

4. Deklarasi mengenai *"APEC Science, Engineering and Technology Roundtable Meeting on the APEC Agenda for S & T Industry Cooperation into the 21st Century"*

5. Prosiding mengenai *"APEC Science, Engineering and Technology Roundtable Meeting on the APEC Agenda for S & T Industry Cooperation into the 21st Century"*

6. Laporan Khas mengenai *"The Water Crisis : A Compelling Case for Intergrated Water Resources Management in Malaysia"*

7. Laporan Kajian mengenai *"Malaysia's Natural Resources Management : An Integrated Approach"*

8. Monograf mengenai *"Cancer and Mortality"* oleh Prof. Looi Lai Meng F.A.Sc.

9. *Newsletter*

Sepanjang tahun 1998 Akademi telah menerima 355 bahan penerbitan dari luar negara dan 193 bahan penerbitan dari dalam

3. Proceedings of "Seminar on ASEAN S & T Vision : Towards Technologically Competent ASEAN"

4. Declaration By Apec Science, Engineering And Technology Roundtable Meeting on the Apec Agenda for S&T Industry Cooperation Into The 21st Century

5. Proceedings of APEC Science, Engineering and Technology Roundtable Meeting on the APEC Agenda for Science and Technology Industry Cooperation into the 21st Century

6. Special Report on "The Water Crisis : A Compelling Case for Integrated Water Resources Management in Malaysia"

7. Research Report on "Malaysia's Natural Resources Management: An Integrated Approach"

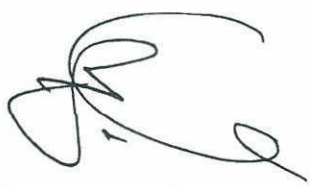
8. Monograph on ASM Back To School Lecture Series "Cancer And Immortality" by Prof Dr Looi Lai Meng F.A.Sc.

9. Newsletters

In 1998 the Academy received 355 publications from international institutions and 193 publications

negara yang terdiri daripada Jurnal, Buku, Prosiding, Berita Akademi dan Laporan Tahunan. Akademi juga mengedarkan lebihkurang 1900 naskhah Newsletter dan 800 Laporan Tahunan di dalam dan luar negeri. Saya ingin menyampaikan ucapan terima kasih kepada Fellow yang telah meluangkan masa dan mencurahkan pengetahuan secara berterusan kepada Akademi. Sokongan kakitangan yang baik amat diperlukan dan saya ucapkan terima kasih kepada semua kakitangan yang bertugas dengan penuh dedikasi dan cemerlang pada tahun ini.

from local institutions including Journals, Books,Proceedings, Academies News and Annual Reports. In 1998 the Academy circulated 1900 Newsletters and 800 Annual Reports locally as well as abroad. I would like to express my appreciation and gratitude to our Fellows who have continued to give generously of their time and knowledge. Good staff support is also essential. I wish to thank all members of our dedicated staff for their excellent work this year.



Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc.
Presiden, Akademi Sains Malaysia
President, Academy of Sciences Malaysia

FUNGSI AKADEMI SAINS MALAYSIA
FUNCTIONS OF THE ACADEMY OF SCIENCES MALAYSIA

- untuk menggalakkan dan merangsang pembangunan sains, kejuruteraan dan teknologi.
- untuk mengadakan forum pertukaran pendapat di kalangan ahli sains, jurutera dan ahli teknologi.
- untuk menggalakkan kesedaran negara, pemahaman dan penghargaan akan peranan sains, kejuruteraan dan teknologi dalam kemajuan manusia.
- untuk menggalakkan daya rekaciptaan di kalangan ahli sains, jurutera dan ahli teknologi.
- untuk menggalakkan sifat berdikari negara dalam bidang sains, kejuruteraan dan teknologi.
- untuk bertindak sebagai forum untuk mengekalkan kesedaran di pihak kerajaan akan pentingnya peranan sains, kejuruteraan dan teknologi dalam proses pembangunan negara dan membawa kepada perhatian ahli sains, jurutera dan ahli teknologi akan keperluan-keperluan pembangunan negara.

- *to promote and foster the development of science, engineering and technology.*
- *to provide a forum for the inter-change of ideas among scientists, engineers and technologists.*
- *to promote national awareness, understanding and appreciation of the role of science, engineering and technology in human progress.*
- *to promote creativity among scientists, engineers and technologists.*
- *to promote national self-reliance in the fields of science, engineering and technology.*
- *to act as a forum for maintaining awareness on the part of the Government of the significance of the role of science, engineering and technology in the development process of the nation and for bringing national development needs to the attention of scientists, engineers and technologists.*

- untuk menganalisa masalah-masalah tertentu negara dan mengenalpasti di mana sains, kejuruteraan dan teknologi dapat memberi sumbangan kepada penyelesaian masalah dengan membuat syor-syor kepada Kerajaan.

- *to analyse particular national problems and identify where science, engineering and technology can contribute to their solution and accordingly to make recommendations to the Government.*

- untuk sentiasa mengambil perhatian tentang perkembangan sains, kejuruteraan dan teknologi serta mengenalpasti perkembangan-perkembangan yang relevan dengan keperluan negara dan membawa kepada perhatian kerajaan akan perkembangannya.

- *to keep in touch with developments in science, engineering and technology and identify those developments which are relevant to national needs and to bring such developments to the attention of the Government.*

- untuk menyediakan laporan-laporan, kertas-kertas atau dokumen-dokumen lain berhubungan dengan dasar sains, kejuruteraan dan teknologi negara dan membuat syor-syor yang perlu kepada Kerajaan.

- *to prepare reports, papers or other documents relating to the national science, engineering and technology policy and make the necessary recommendations to the Government.*

- untuk mendayausahakan dan membiayai kajian pelbagai disiplin yang berkaitan serta keperluan pemahaman yang lebih baik tentang implikasi-implikasi sosial dan ekonomi tentang sains, kejuruteraan dan teknologi.

- *to initiate and sponsor multi-disciplinary studies related to and necessary for the better understanding of the social and economic implications of science, engineering and technology.*

- untuk menggalakkan penyelidikan dan pembangunan pendidikan serta latihan tenaga manusia yang sesuai dalam bidang saintifik, kejuruteraan dan teknologi.
- untuk mengadakan dan mengekalkan hubungan antara Akademi dan badan-badan luar negeri yang mempunyai objektif yang hampir sama atau hampir serupa dengan objektif Akademi.
- untuk melakukan apa-apa perkara lain dalam bidang sains kejuruteraan dan teknologi sebagaimana yang diminta oleh Kerajaan dari semasa ke semasa.
- untuk melakukan apa-apa tindakan lain yang konsisten dengan Akta Akademi Sains 1994 sebagaimana yang dikehendaki untuk meningkatkan kemajuan sains, kejuruteraan dan teknologi di Malaysia dan kebajikan serta taraf Akademi.

- *to encourage research and development and education and training of the appropriate scientific, engineering and technical manpower.*
- *to establish and maintain relations between the Academy and overseas bodies having the same or almost similar objectives in science, engineering and technology as the Academy.*
- *to advice on matters related to science, engineering and technology as may be requested by the Government from time to time.*
- *to do such other acts which are consistent with the Academy of Sciences Act 1994 as may be required in order to further the advancement of science, engineering and technology in Malaysia and the welfare and status of the Academy.*

FELLOW KEHORMAT AKADEMI SAINS MALAYSIA
HONORARY FELLOW OF THE
ACADEMY OF SCIENCES MALAYSIA



YAB DATO' SERI DR MAHATHIR MOHAMAD
FELLOW KEHORMAT/PERDANA MENTERI MALAYSIA
HONORARY FELLOW/*PRIME MINISTER OF MALAYSIA*

FELLOW BARU AKADEMI SAINS MALAYSIA 1998



PROFESSOR DATO' PADUKA
DR MUSTAFA EMBONG F.A.Sc.
(SAINS PERUBATAN
MEDICAL SCIENCES)
Profesor Perubatan/Perunding
Professor of Medicine/Consultant
Endocrinologist/Diabetologist



IR K. KUMARASIVAM F.A.Sc.
(SAINS KEJURUTERAAN
ENGINEERING SCIENCES)
Presiden Pengasas *Founder President of*
ENSEARCH



DR NG SOON F.A.Sc.
(SAINS KIMIA
CHEMICAL SCIENCES)
Bekas Profesor Kimia Fizikal
Former Professor of Physical Chemistry,
University of Malaya



PROFESSOR DR HO CHEE CHEONG
F.A.Sc.
(SAINS KIMIA
CHEMICAL SCIENCES)
Profesor, Jabatan Kimia
Professor, Department of Chemistry,
University of Malaya



DR MOHAMED AWANG LAH F.A.Sc.
(TEKNOLOGI MAKLUMAT
INFORMATION TECHNOLOGY)
Timbalan Presiden, Pembangunan Teknologi
Vice President, Technology Development
MIMOS Bhd.



DR FRANCIS S.P. NG F.A.Sc.
(SAINS BIOLOGI
BIOLOGICAL SCIENCES)
Pengurus Penyelidikan
Research Manager
TROPBIO Research Sdn. Bhd



DATUK DR YUSOF BASIRON F.A.Sc.
(PEMBANGUNAN S&T DAN INDUSTRI
S&T DEVELOPMENT AND INDUSTRY)
Ketua Pengarah
Director General, PORIM

SENARAI FELLOW AKADEMI SAINS MALAYSIA
LIST OF FELLOWS
ACADEMY OF SCIENCES MALAYSIA 1998

PARA FELLOW DALAM BIDANG SAINS PERUBATAN
FELLOWS IN MEDICAL SCIENCES

1. **Dr M.K. Rajakumar F.A.Sc.**
   (Naib Presiden Akademi)
   Rakan Kanan, Drs Oorloff, Rajakumar & Rakan Kongsi
   (Vice-President of the Academy)
   Senior Partner, Drs Oorloff Rajakumar & Partners

2. **Tan Sri Dato' Dr Haji Abdul Majid Ismail F.A.Sc.**
   Pengerusi
   Chairman
   Syarikat Endah Seri Sdn Bhd

3. **Profesor Dr Mak Joon Wah F.A.Sc.**
   Profesor Perubatan,
   Fakulti Perubatan
   Professor of Medicine
   Faculty of Medicine
   Universiti Putra Malaysia

4. **Dato' Dr Lim Kee Jin F.A.Sc.**
   Pakar Perubatan Jururunding Kanan, Hospital Pakar Johor
   Senior Consultant Physician
   Johor Specialist Hospital

5. **Datuk Dr Hussein Awang F.A.Sc.**
   Jururunding Pakar Bedah Urologi dan Pengarah Perubatan
   Hospital Tawakal
   Consultant Urological Surgeon and Medical Director
   Tawakal Hospital

6. **Profesor Dato' Dr Khalid Abdul Kadir F.A.Sc.**
   Pengarah dan Profesor Perubatan
   Director and Professor of Medicine
   Hospital Universiti Kebangsaan Malaysia

7. **Dato' Dr M. Jegathesan F.A.Sc.**
   Ahli Majlis
   Council Member
   Council on Health Research and Development (COHRED)

8. **Datuk Dr G. Sreenevasan F.A.Sc.**
   Jururunding Pakar Bedah Urologi
   Pusat Perubatan Pantai dan Hospital Assunta
   Consultant Urological Surgeon
   Pantai Medical Centre and Assunta Hospital

9. **Dato' Dr Yahya Awang F.A.Sc.**
   Jururunding Pakar Bedah Kardiotoraks, Institut Jantung Negara
   Consultant Cardiothoracic Surgeon
   National Heart Institute

10. **Datuk Dr Keshmahinder Singh F.A.Sc.**
    Bekas Rakan Kanan, Firma Pembedahan Mata
    Former Senior Partner
    Eye Surgical Practice

11. **Profesor Dr Looi Lai Meng F.A.Sc.**
    Jururunding Kanan
    Histopatologi dan Profesor Patologi
    Senior Consultant Histopathologist and Professor of Pathology
    Universiti Malaya

12. **Dato' Dr Nadason Arumugasamy F.A.Sc.**
    Jururunding Pakar Bedah Neuro
    Consultant Neurosurgeon
    Aru Neuro Sdn Bhd

13. **Profesor Dr Lam Sai Kit F.A.Sc.**
    Ketua Jabatan Mikrobiologi Perubatan
    Head, Department of Medical Microbiology
    Universiti Malay

14. **Tan Sri Dato' Dr Abu Bakar Dato' Suleiman F.A.Sc.**
    Ketua Pengarah Kesihatan
    Kementerian Kesihatan
    Director-General of Health
    Ministry of Health

15. **Tan Sri Dato' Haji Musa Mohamad F.A.Sc.**
    Bekas Naib Canselor
    Former Vice Chancellor
    Universiti Sains Malaysia

16. **Professor Dato' Paduka Dr Mustafa Embong F.A.Sc.**
Profesor Perubatan
Fakulti Perubatan
Professor of Medicine
School of Medicine,
Universiti Sains Malaysia

PARA FELLOW DALAM BIDANG SAINS KEJURUTERAAN
FELLOWS IN ENGINEERING SCIENCES

1. **Raja Tan Sri Ir Zainal Raja Sulaiman F.A.Sc.**
Pengerusi dan Pengarah Urusan
Chairman and Managing Director
Shawinigan Engineering South East Asia

2. **Tan Sri Ir J.G. Daniel F.A.Sc.**
Bekas Ketua Pengarah
Jabatan Pengairan dan Saliran Malaysia
Former Director-General
Department of Irrigation and Drainage Malaysia

3. **Dato' Ir Lee Yee Cheong F.A.Sc.**
(Setiausaha Agung Akademi)
Presiden dan Ketua Pengawai Eksekutif
(Secretary - General of the Academy)
President and Chief Executive Officer
KTA Tenaga Sdn. Bhd.

4. **Dato' Dr Ikmal Hisham Albakri F.A.Sc.**
Pengarah
Director
Kumpulan Arkitek Sdn Bhd

5. **Tan Sri Dato' Ir Abu Zarim Haji Omar F.A.Sc.**
Juru Runding
Consultant
KTA Tenaga Sdn. Bhd.

6. **Tan Sri Dato' Ir Hj. Shahrizaila Abdullah F.A.Sc.**
(Bendahari Kehormat Akademi)
Pengerusi
(Honorary Treasurer)
Chairman
KTA Tenaga Sdn. Bhd.

7. **Dato' Dr Muhammad Ridzuan Haji Salleh F.A.Sc.**
Pengerusi
Chairman
Quantum Field Sdn. Bhd.

8. **Tan Sri Dato' Ir Muhammad Yusuff Muhammad Yunus F.A.Sc.**
Pengerusi
Chairman
Siah Brothers Corporation Bhd/
Expressway Lingkaran Tengah Sdn. Bhd.

9. **Ir Hong Lee Pee F.A.Sc.**
Pengerusi Eksekutif
Executive Chairman
Pilecon Enginerring Sdn. Bhd.

10. **Hijjas Kasturi F.A.Sc.**
Pengarah Eksekutif
Executive Director
Hijjas Kasturi Associates

11. **Ir K. Kumarasivam F.A.Sc.**
Pengerusi
Chairman
ENSEARCH

PARA FELLOW DALAM BIDANG SAINS BIOLOGI
FELLOWS IN BIOLOGICAL SCIENCES

1. **Profesor Dr Abdul Latif Ibrahim F.A.Sc.**
Pengarah Urusan
Direktorat Bioteknologi Kebangsaan,Kementerian Sains, Teknologi dan Alam Sekitar
Managing Director
National Biotechnology Directorate, Ministry of Science, Technology and the Environment

2. **Profesor Dato' Dr Ahmad Nawawi Haji Ayob F.A.Sc.**
Profesor
Jabatan Botani
Professor
Department of Botany
Universiti Malaya

3. **Profesor Tan Sri Dato' Dr Syed Jalaludin Syed Salim F.A.Sc.**
Naib Canselor dan Profesor
Vice Chancellor and Professor
Universiti Putra Malaysia

4. **Datuk Dr Ahmad Zaharudin Idrus F.A.Sc.**
Naib Canselor
Vice Chancellor
Universiti Teknologi Malaysia

5. **Dato' Dr Salleh Mohd Nor F.A.Sc.**
Bekas Ketua Pengarah
Institut Penyelidikan Hutan Malaysia
Former Director General
Forest Research Institute of Malaysia

6. **Profesor Dato' Dr Zakri A. Hamid F.A.Sc.**
Timbalan Naib Canselor (Hal Ehwal Akademik)
Deputy Vice Chancellor (Academic Affairs)
Universiti Kebangsaan Malaysia

7. **Tan Sri Dato' Dr Ahmad Mustaffa Babjee F.A.Sc.**
Pengerusi
Chairman
Charoen Pokphand Group (Malaysia)

8. **Dr Yong Hoi Sen F.A.Sc.**
Bekas Profesor
Jabatan Zoologi
Former Professor
Department of Zoology
Universiti Malaya

9. **Profesor Emeritus Dr Chin Hoong Fong F.A.Sc.**
Profesor Emeritus
Jabatan Agronomi dan Hortikultur
Emeritus Professor
Department of Agronomy and Horticulture
Universiti Putra Malaysia

10. **Dr Francis S.P. Ng F.A.Sc.**
Pengurus Penyelidik
Research Manager
TROPBIO Sdn. Bhd.

PARA FELLOW DALAM BIDANG MATEMATIK DAN SAINS FIZIK
FELLOWS IN MATHEMATICAL AND PHYSICAL SCIENCES

1. **Dato' Dr Chatar Singh F.A.Sc.**
Bekas Profesor Fizik
Former Professor of Physics
Universiti Sains Malaysia

2. **Dato' Dr Ahmad Tajuddin Ali F.A.Sc.**
Pengerusi Eksekutif
Executive Chairman
Tenaga Nasional Berhad

3. **Profesor Dato' Dr Mohd. Sham Mohd. Sani F.A.Sc.**
Profesor
Jabatan Geografi
Professor
Geographical Department
Universiti Kebangsaan Malaysia

4. **Datuk Dr R. Ratnalingam F.A.Sc.**
Bekas Profesor Fizik dan Pengarah Pusat Perundingan dan Inovasi
Former Professor of Physics and Director of Innovation and Consultancy Centre
Universiti Sains Malaysia

5. **Encik Fateh Chand F.A.Sc.**
Bekas Ketua Pengarah
Jabatan Penyiasatan Kajibumi Malaysia
Former Director-General
Geological Survey Department of Malaysia

6. **Profesor Dr Shaharir Mohd Zin F.A.Sc.**
Profesor Matematik
Professor of Mathematics
Universiti Kebangsaan Malaysia

7. **Dr Chia Swee Ping F.A.Sc.**
Naib Presiden
Hal Ehwal Pendidikan
Vice-President
Academic Affairs
INTI College Malaysia

PARA FELLOW DALAM BIDANG SAINS KIMIA
FELLOWS IN CHEMICAL SCIENCES

1. **Tan Sri Dr B.C. Sekhar F.A.Sc.**
Pengerusi Eksekutif
Executive Chairman
STI Global Consult Sdn Bhd

2. **Tan Sri Datuk Dr Augustine Ong Soon Hock F.A.Sc.**
Pengarah
Director
Country Height Education

3. **Dr Haji Badri Muhammad F.A.Sc.**
Pengarah
Bahagian Kimia dan Teknologi,
Institut Penyelidikan Kelapa Sawit Malaysia
Director
Chemistry and Technology Division
Palm Oil Research Institute of Malaysia

4. **Profesor Dr V.G. Kumar Das F.A.Sc.**
Pengarah
Director
Advanced Materials Characterisation Allied Laboratories (AMCAL)
Universiti Malaya

5. **Dr Ng Soon F.A.Sc.**
Bekas Profesor
Former Professor
Physical Chemistry
Universiti Malaya

6. **Profesor Dr Ho Chee Cheong F.A.Sc.**
Profesor
Jabatan Kimia
Professor
Department of Chemistry
Universiti Malaya

PARA FELLOW DALAM BIDANG TEKNOLOGI MAKLUMAT/
FELLOWS IN INFORMATION TECHNOLOGY

1. **YM Tengku Datuk Dr Mohd. Azzman Shariffadeen Tengku Ibrahim F.A.Sc.**
Presiden dan Ketua Eksekutif
President and Chief Executive Officer
MIMOS Berhad

2. **Profesor Dato' Dr Mohamad Zawawi Ismail F.A.Sc.**
Naib Canselor dan Profesor
Kejuruteraan Elektronik
Vice Chancellor and Professor of Electronic Engineering
Universiti Malaysia Sarawak

3. **Tan Sri Dato' Ir Shamsuddin Abdul Kadir F.A.Sc.**
Pengerusi Eksekutif
Executive Chairman
Sapura Holdings Sdn. Bhd.

4. **Haji Ismail Sulaiman F.A.Sc.**
Pengarah Urusan
Managing-Director
Mesiniaga Sdn. Bhd.

5. **Emeritus Profesor Dr Tan Wang Seng F.A.Sc.**
Pengarah Urusan
Managing Director
Kulim High-Tech

6. **Dr Mohamed Ariff Nun F.A.Sc.**
Ketua Pegawai Operasi
Chief Operating Officer
Multimedia Development Corporation

7. **Dr Mohamed Awang Lah F.A.Sc.**
Naib Presiden
Teknologi Pembangunan
Vice President
Technology Development
MIMOS Berhad

PARA FELLOW DALAM BIDANG PEMBANGUNAN SAINS & TEKNOLOGI DAN INDUSTRI
FELLOWS IN SCIENCE & TECHNOLOGY DEVELOPMENT AND INDUSTRY

1. **Tan Sri Dato' Dr Mohd. Rashdan Haji Baba F.A.Sc.**
Pengerusi
Chairman
Computer Systems Advisers (M) Berhad

2. **Tan Sri Dato' Dr Haji Ani Arope F.A.Sc.**
Pengerusi
Chairman
Silver Ridge Sdn. Bhd.

3. **Tan Sri Datuk Dr Haji Omar Abdul Rahman F.A.Sc.**
(Presiden Akademi)
Penasihat Sains
Jabatan Perdana Menteri
(President of the Academy)
Science Advisor
Prime Minister's Department

4. **Tan Sri Dato' Dr Mohamed Yusof Hashim F.A.Sc.**
Ketua Eksekutif, Majlis Promosi
Kelapa Sawit Malaysia
Chief Executive
Malaysian Palm Oil Promotion Council

5. **Tan Sri Dato' Ir Wan Abdul Rahman Yaacob F.A.Sc.**
Pengerusi
Chairman
Le Klass Sdn Bhd

6. **Datuk Dr Syed M.A. Alhady F.A.Sc.**
Bekas Pakar Bedah Kanan
Hospital Besar, Kuala Lumpur
Former Senior Surgeon
Kuala Lumpur, General Hospital

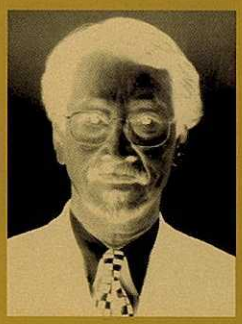
7. **Datuk Dr Abdul Aziz Sheikh Abdul Kadir F.A.Sc.**
Pengarah
Lembaga Getah Malaysia
Director
Malaysian Rubber Board

8. **Datuk Yong Poh Kon F.A.Sc.**
Pengarah Urusan Kumpulan
Group Managing Director
Royal Selangor International Sdn. Bhd.

9. **T. Ananda Krishnan F.A.Sc.**
Usaha Tegas Sdn. Bhd.

10. **Datuk Dr Yusof Basiron F.A.Sc.**
Ketua Pengarah
Director General
Palm Oil Research Institute of Malaysia

AHLI-AHLI MAJLIS AKADEMI SAINS MALAYSIA 1998
MEMBERS OF COUNCIL OF THE ACADEMY OF SCIENCES MALAYSIA 1998



YBhg Tan Sri Datuk Dr Hj Omar
Abdul Rahman F.A. Sc.
Presiden/*President*



YBhg Dr M.K. Rajakumar F.A.Sc.
Naib Presiden/*Vice President*

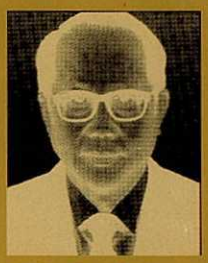


YBhg Dato' Ir. Lee Yee Cheong F.A.Sc.
Setiausaha Agung/*Secretary General*



YBhg Tan Sri Dato'
Ir Shahrizaila Abdullah F.A.Sc.
Bendahari Kehormat/*Honorary Treasurer*

AHLI-AHLI MAJLIS
COUNCIL MEMBERS



YBhg Tan Sri Datuk
Dr Augustine S.H. Ong F.A. Sc.



YBhg Datuk Dr Ahmad
Zaharudin Idrus F.A.Sc.



YBhg Profesor Tan Sri Dato' Dr Syed
Jalaluddin bin Syed Salim F.A.Sc.



YBhg Profesor Dato' Dr Mohd
Zawawi bin Ismail F.A.Sc.



YBhg Tan Sri Dato' Dr Ir Wan
A. Rahman Yaacob F.A.Sc.



YBhg Dato' Dr Chatar
Singh F.A.Sc.



YBhg Profesor Dr Looi Lai Meng
F.A.Sc.



YBhg Profesor Dato' Dr Zakri
Abdul Hamid F.A.Sc.



YBhg Dato' Dr Ikmal Hisham
Albakri F.A.Sc.



YBhg Datuk Dr Abdul Aziz
S.A. Kadir F.A.Sc.



YBhg Encik Fateh Chand F.A.Sc.



YBhg Profesor Dr Yong Hoi Sen F.A.Sc.

MESYUARAT MAJLIS
COUNCIL MEETINGS

Bagi tahun berakhir pada 31 Disember 1998, Majlis telah bermesyuarat lima (5) kali seperti berikut:

- 21 Mac 1998
- 23 Mei 1998
- 15 Ogos 1998
- 28 November 1998
- 19 Disember 1998

Pada mesyuarat ini, Majlis telah membincangkan isu-isu berikut :

- Kajian Semula Belanjawan 1998 dan aktiviti program
- Siri Syarahan ASM-PETROSAINS
- Geran Penyelidikan Dr Ranjeet Bhagwan Singh dan Syarahan Peringatan
- Penubuhan Tabung ASM
- Penubuhan ASEAN Council of Academies of Sciences, Engineering and Technology and Similar National Organisations (ASEAN-CASE)
- Projek Taman Botani Kebangsaan
- Pengendalian Mesyuarat Mejabulat APEC S.E.T.
- Kajian Semula Polisi S&T Kebangsaan

For the year ending 31st December 1998, the Council met five (5) times as follows:

- *21st March 1998*
- *23rd May 1998*
- *15th August 1998*
- *28th November 1998*
- *19th December 1998*

At these meetings, the Council deliberated on the following issues:

- *Review of 1998 Budget and Program of Activities*
- *ASM-PETROSAINS Lecture Series*
- *Dr Ranjeet Bhagwan Singh Research Grant and Memorial Lecture*
- *ASM Fund Raising*
- *Formation of the ASEAN Council of Academies of Sciences, Engineering and Technology and Similar National Organisations (ASEAN-CASE)*
- *National Botanic Garden Project*
- *Organisation of APEC S.E.T. Roundtable*
- *Review of National S&T Policy*

JAWATANKUASA KERJA DAN PROGRAM
WORKING COMMITTEES AND PROGRAMMES

Untuk membantu Majlis Akademi dalam pentadbiran dan operasi Akademi, Majlis telah menubuhkan beberapa Jawatankuasa yang bertanggung-jawab untuk menjalankan beberapa fungsi dan tanggung-jawab. Dalam tahun 1998 Jawatankuasa-jawatankuasa adalah seperti berikut:

To assist the Council in its management and operation of the Academy, the Council has set up various committees which are responsible for carrying out specific functions and responsibilities. In 1998, the following committees were operational:

JAWATANKUASA EKSEKUTIF/*EXECUTIVE COMMITTEE*

Presiden/*President* – Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc.
Naib Presiden/*Vice President* – Dr M.K. Rajakumar F. A.Sc.
Setiausaha Agung/*Sec. General* – Dato' Ir Lee Yee Cheong F.A.Sc.
Bendahari Kehormat/*Hon. Treasurer* – Tan Sri Ir Shahrizaila Abdullah F.A.Sc.

JAWATANKUASA KEWANGAN/*FINANCE COMMITTEE*

Pengerusi/*Chairman*
Tan Sri Ir Shahrizaila Abdullah F.A.Sc.

JAWATANKUASA ANUGERAH/*AWARDS COMMITTEE*

Pengerusi/*Chairman*
Dr M.K. Rajakumar F.A.Sc.

JAWATANKUASA HAL EHWAL ANTARABANGSA/ *INTERNATIONAL AFFAIRS COMMITTEE*

Pengerusi/*Chairman*
Dato' Ir Lee Yee Cheong F.A.S.c.

JAWATANKUASA KEAHLIAN/ *MEMBERSHIP COMMITTEE*

Pengerusi/*Chairman* – Tan Sri Datuk Dr Omar Abd. Rahman F.A.Sc.

Sains Biologi/*Biological Sciences*
Prof Tan Sri Dato' Dr Syed Jalaluddin Syed Salim F.A.Sc.

Sains Kimia/*Chemical Sciences*
Tan Sri Datuk Dr Augustine S.H. Ong F.A.Sc.

Pembangunan Sains & Teknologi dan Industri/*S&T Development and Industry*
Tan Sri Dato' Ir Wan Abdul Rahman Wan Yaacob F.A.Sc.

Sains Perubatan/*Medical Sciences*
Prof Looi Lai Meng F.A.Sc.

Sains Kejuruteraan/*Engineering Sciences*
Dato' Dr Ikmal Hisham AlBakri F.A.Sc..

Sains Matematik dan Fizik/ *Mathematical and Physical Sciences*
Dato' Dr Chatar Singh F.A.Sc.

Teknologi Maklumat/*Information Technology*
Prof Dato' Ir Dr Mohamad Zawawi Ismail

JAWATANKUASA PROGRAM
PROGRAMME COMMITTEE

Pengerusi Koordinator
Co-ordinating Chairman
Tan Sri Datuk Dr Omar Abd. Rahman F.A.Sc.

JAWATANKUASA KERJA/*WORKING COMMITTEES*

i) Nasihat kepada Kerajaan/*Advice to Government*

Pengerusi Penyelaras
Co-ordinating Chairman – Tan Sri Datuk Dr Omar Abd. Rahman F.A.Sc.

Pertanian dan lain-lain Sektor Sumber/*Agriculture and Other Resource Based Sectors*
Pengerusi/*Chairman* : Datuk Dr Abd Aziz Sheikh Abdul Kadir F.A.Sc.
Biodiversiti/*Biodiversity*
Pengerusi/*Chairman* : Prof Datuk Dr Zakri A. Hamid F.A.Sc.
Pengurusan Sumber Asli/*Natural Resources Management*
Pengerusi/*Chairman* : Encik Fateh Chand F.A. Sc.
Pendidikan Sains/*Science Education*
Pengerusi/*Chairman* : Dato' Dr Ahmad Zaharudin Idrus F.A.Sc.

ii) Sumbangan kepada Pelbagai Industri - Meningkatkan Keupayaan Teknologi/*Contribution to Industrial Development - Enhancing Technological Capability*
Pengerusi/*Chairman* : Datuk Dr Yusof Basiron F.A.Sc.

iii) Pembangunan Budaya Kecemerlangan/*Development of Culture of Excellence*
Pengerusi/*Chairman*: Prof. Tan Sri Dato' Dr Syed Jalaluddin Syed Salim F.A.Sc.

iv) Kesedaran dan Kefahaman Awam mengenai S&T/*Public S&T Awareness and Understanding*
Pengerusi/*Chairman* : Tan Sri Dato' Dr Augustine S.H. Ong F.A.Sc.

v) Technology Maklumat/*Information Technology*
Pengerusi/*Chairman*: Prof. Dato' Dr Mohamad Zawawi Ismail F.A.Sc.

vi) Tabung Penyelidikan Perubatan Dr Ranjeet Bhagwan Singh/*Dr Ranjeet Bhagwan Singh Medical Research Fund*
Pengerusi/*Chairman* : Dato' Dr M. Jegathesan F.A.Sc./Prof Dr Looi Lai Meng F.A.Sc.

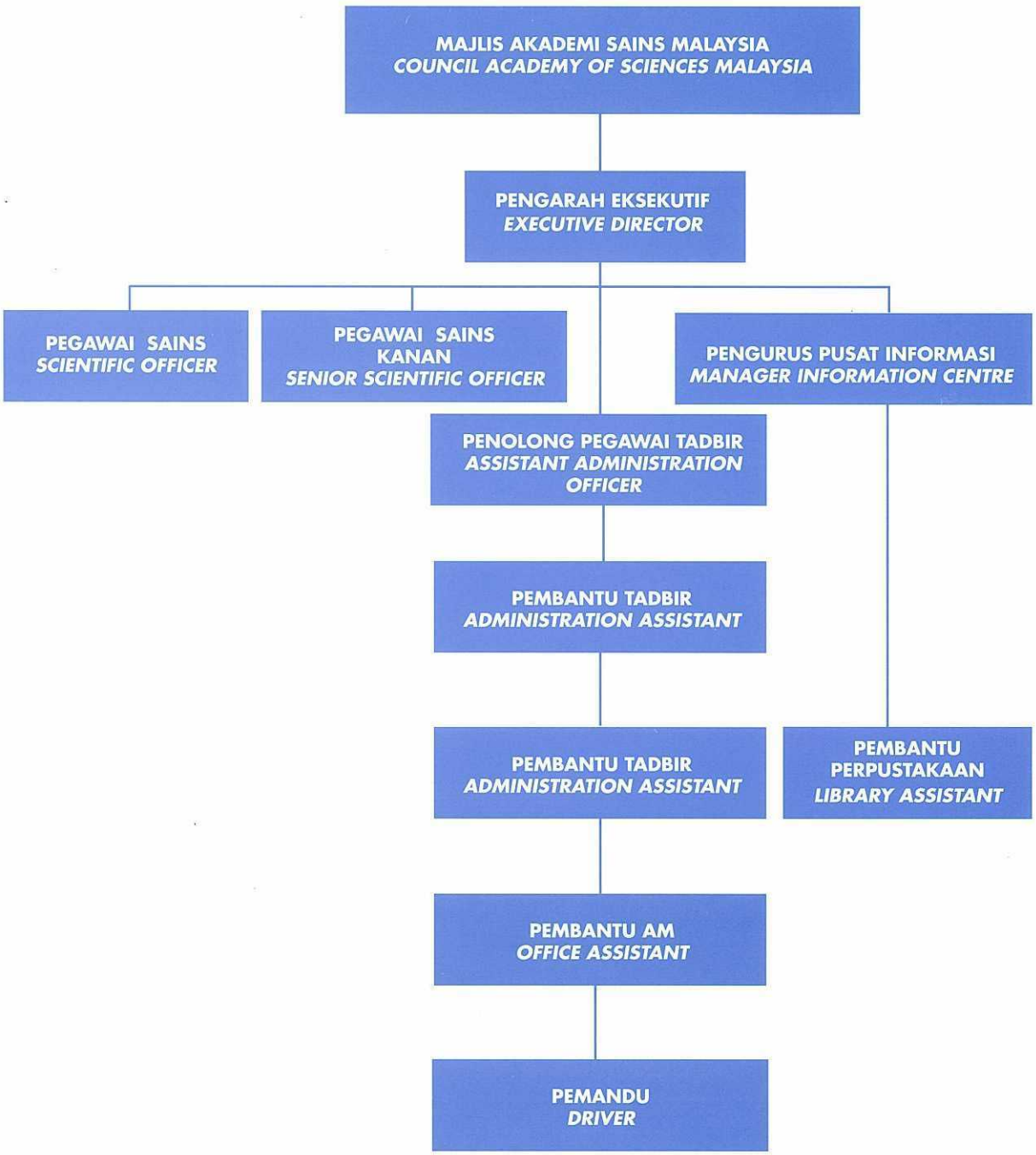
vii) Projek Taman Botani Kebangsaan/*National Botanic Garden Project*
Pengerusi Task Force/Chairman of Task Force : Dato' Dr Salleh Mohd Noor F.A.Sc.

viii) Program R&D Malaysia Di Antartika/*Malaysian R&D Program in Antarctica*
Kordinator/*Co-ordinator* : Dato' Dr Salleh Mohd Noor F.A.Sc.

ix) Penerbitan/*Publication*
Pengerusi/*Chairman* : Prof Dr Yong Hoi Sen F.A.Sc.

x) Alam Sekitar/*Environment*
Pengerusi/*Chairman* : Encik Fateh Chand F.A.Sc.

CARTA ORGANISASI AKADEMI SAINS MALAYSIA
ORGANISATION CHART, ACADEMY OF SCIENCES MALAYSIA



Acara Utama
Highlights

Mesyuarat Agung Tahunan Ketiga Akademi Sains Malaysia

Academy of Sciences Malaysia Third Annual General Meeting

Mesyuarat Agung Tahunan Ketiga Akademi telah diadakan pada 25 April 1998 dengan dipengerusikan oleh Presiden Akademi. Ia dihadiri oleh 34 Fellows. Mesyuarat telah membincangkan dan meluluskan perkara-perkara berikut :

- Laporan Tahunan 1997 dan Penyata Kewangan
- Pemilihan tujuh Fellow baru Akademi
  - Prof Dato' Paduka Dr Mustaffa Embong F.A.Sc.[Sains Perubatan]
  - Ir K. Kumarasivam F.A.Sc. [Sains Kejuruteraan]
  - Prof Ng Soon F.A.Sc. [Sains Kimia]
  - Prof Dr Ho Chee Cheong F.A.Sc. [Sains Kimia]
  - Dr Mohamad Awang Lah F.A.Sc. [Teknologi Maklumat]
  - Dr Francis S.P. Ng F.A.Sc. [Sains Biologi]
  - Datuk Dr Yusof Basiron F.A.Sc. [Pembangunan S&T dan Industri]
- Pemilihan enam ahli Majlis baru
  - Prof Dato' Dr Zakri Abdul Hamid F.A.Sc.
  - Prof Dr Looi Lai Meng F.A.Sc.
  - Prof Dr Yong Hoi Sen F.A.Sc.
  - Dato' Dr Ikmal Hisham AlBakri F.A.Sc.
  - Encik Fateh Chand F.A.Sc.
  - Datuk Dr Abdul Aziz S.A. Kadir F.A.Sc.

The Academy's Third Annual General Meeting was held on 25th April 1998 with the President in the Chair. It was attended by 34 Fellows. The meeting discussed and approved the following:

- *1997 Annual Report and Statement of Accounts*
- *Election of seven new Fellows of the Academy*
  - *Prof Dato' Paduka Dr Mustaffa Embong F.A.Sc.[Medical Sciences]*
  - *Ir. K. Kumarasivam F.A.Sc. [Engineering Sciences]*
  - *Prof Ng Soon F.A.Sc. [Chemical Sciences]*
  - *Prof Dr Ho Chee Cheong F.A.Sc. [Chemical Sciences]*
  - *Dr Mohamad Awang Lah F.A.Sc. [Information Technology]*
  - *Dr Francis S.P. Ng F.A.Sc. [Biological Sciences]*
  - *Datuk Dr Yusof Basiron F.A.Sc. [Science and Technology Development & Industry]*
- *Election of six new members of the Council*
  - *Prof Dato' Dr Zakri Abdul Hamid F.A.Sc.*
  - *Prof Dr Looi Lai Meng F.A.Sc.*
  - *Prof Dr Yong Hoi Sen F.A.Sc.*
  - *Dato' Dr Ikmal Hisham AlBakri F.A.Sc.*
  - *Mr Fateh Chand F.A.Sc.*
  - *Datuk Dr Abdul Aziz S.A. Kadir F.A.Sc.*

Presiden sedang menyampaikan Ucapan Presiden semasa Mesyuarat Agung Tahunan ke 3
President delivering the Presidential Address during the 3rd Annual General Meeting (AGM)





Ahli Jawatankuasa Exco di Mesyuarat Agung ke 3
Members of the Exco at the 3rd AGM

Di akhir Mesyuarat Agung Tahunan, Presiden telah menyampaikan Ucapan Presiden. Presiden telah mengutarakan beberapa pencapaian utama Akademi dalam tahun 1997. Diantaranya adalah Seminar *"ASEAN Science and Technology Vision : Towards Technologically Competent ASEAN"*. Satu deklarasi mengenai Visi S&T Ke Arah Kecekapan Teknologi ASEAN telah digubal dan diserahkan kepada YAB Dato' Seri Dr Mahathir Mohamad, Perdana Menteri Malaysia untuk dibentangkan di Persidangan Summit Tidak Formal Sempena Sambutan Ulangtahun ke 30 ASEAN. Akademi juga telah menganjurkan Syarahan Perdana 1997. Dr David Baltimore, Presiden California Institute of Technology (Caltech) dan Pemenang Anugerah Nobel dalam Fisiologi atau Perubatan dalam tahun 1975 menyampaikan syarahan yang bertajuk *"Cellular Signalling and Oncogenesis"*. Akademi juga telah menandatangani beberapa Memorandum Persefahaman dengan Akademi-Akademi lain di dalam usahanya untuk meluaskan rangkaian hubungannya dan mewujudkan perhubungan antara-bangsa di dalam bidang sains, kejuruteraan dan teknologi.

Presiden mendorong Akademi untuk mengambil kesempatan ini untuk mengenengahkan pandangan dan pendapat dan mencadangkan kepada Kerajaan

At the end of the Annual General Meeting, the President delivered the Presidential Address. The President highlighted some of the Academy's major achievements in 1997. Amongst them was the regional seminar on "ASEAN Science and Technology Vision : Towards Technologically Competent ASEAN". The seminar adopted a declaration on S&T Vision Towards Technologically Competent ASEAN which was submitted to YAB Dato' Seri Dr Mahathir MohamaFd, Prime Minister of Malaysia to be presented at the ASEAN 30th Anniversary Informal Summit. The Academy also held its 1997 Annual Oration. Dr David Baltimore, President of California Institute of Technology (Caltech) and Nobel Laureate in Physiology or Medicine in 1975 delivered the oration on "Cellular Signalling and Oncogenesis". The Academy signed several MOUs with sister Academies in its effort to network and establish international linkages in the areas of science, engineering and technology.

The President urged the Academy to seize the opportunity to put forth its views and opinions and to recommend that the Government strengthen its S&T component in the economic structure. He also urged

supaya mengukuhkan komponen S&T di dalam struktur ekonomi negara. Beliau juga mendorong Akademi untuk memainkan peranan bagi menggalakkan kerjasama penyelidikan antarabangsa.

Presiden mengumumkan bahawa Akademi telah memulakan proses untuk menubuhkan satu Tabung Dana sebanyak RM50 juta untuk membiayai aktiviti-aktiviti Akademi. Presiden menggulung ucapannya dengan mengucapkan terima kasih kepada semua Fellow di atas sokongan dan sumbangan mereka dan beliau juga menyatakan penghargaan kepada Sekretariat Akademi di atas tugas mereka yang cemerlang.

the Academy to play its role in facilitating international collaboration in research.

The President announced that the Academy has initiated the process of establishing an Endowment Fund of RM50 million to finance the Academy's activities. The President concluded his address by thanking all the Fellows for their support and contribution and he also expressed his appreciation to the Secretariat of the Academy for their excellent work.



Fellow Akademi sedang menghadiri
Mesyuarat Agung Tahunan ke 3
Fellows of the Academy attending the 3rd AGM

Jamuan Makan Malam Tahunan Akademi Sains Malaysia

Academy of Sciences Malaysia Annual Dinner

Akademi Sains Malaysia telah mengadakan Jamauan Makan Malam Tahunan yang keempat di Hotel JW Marriott, Kuala Lumpur. Jamuan makan malam itu dihadiri oleh YAB Dato' Seri Dr Mahathir Mohamad, Perdana Menteri Malaysia dan YABhg Datin Seri Dr Siti Hasmah Mohd Ali. Ia juga dihadiri oleh Menteri Sains, Teknologi dan Alam Sekitar, YB Datuk Law Hieng Ding dan Ketua Setiausaha Negara YBhg Tan Sri Abdul Halim Ali.

Lebih kurang 400 tetamu yang terdiri daripada ketua-ketua dan pegawai-pegawai agensi-agensi

The Academy of Sciences Malaysia held its fourth Annual Dinner on the 2nd of November 1998 at the JW Marriott Hotel, Kuala Lumpur. The dinner was graced by the Rt Hon Prime Minister of Malaysia, Dato' Seri Dr Mahathir Mohamad and YABhg Datin Seri Dr Siti Hasmah Mohd Ali. The dinner was also honoured by the attendance of the Minister of Science, Technology and the Environment, YB Datuk Law Hieng Ding and the Chief Secretray to the Government, YBhg Tan Sri Abdul Halim Ali.

Approximately 400 guests comprising heads and officials of



YAB Dato' Seri Dr Mahathir Mohamad dan YABhg Datin Seri Dr Siti Hasmah Mohd Ali di Majlis Makan Malam ASM

YAB Dato' Seri Dr Mahathir Mohamad and YABhg Datin Seri Dr Siti Hasmah Mohd Ali at the ASM Annual Dinner

Kerajaan dan kementerian, kapten-kapten industri, dan pemimpin komuniti sains menghadiri makan malam tersebut.

Acara kemuncak malam itu adalah Ucapan Tahunan Perdana Menteri kepada Akademi, Ucapan Presiden dan penyampaian sijil perlantikan kepada enam Fellow baru Akademi oleh YAB Perdana Menteri Malaysia, Dato' Seri Dr Mahathir Mohamad. Ucapan Tahunan yang disampaikan oleh Perdana Menteri menyatakan diantara lain kepentingan untuk mengdokumen-tasikan semua pencapaian di dalam pelbagai bidang sains, kejuruteraan dan teknologi; satu cabaran kepada komuniti sains Malaysia untuk menghasilkan seorang Nobel Laureate menjelang tahun 2020; Kerajaan akan terus meminta nasihat dan cadangan Akademi mengenai isu-isu S&T; Akademi menjadi platform kepada para saintis, jurutera dan ahli teknologi untuk menyalurkan input dan pandangan mereka kepada proses pembangunan negara dan pada masa yang sama menyediakan koordinasi dan arah tuju bagi komuniti sains; dan Akademi akan terus memainkan peranannya sebagai penasihat di dalam bidang S&T kepada Kerajaan dan juga sektor swasta.

Government agencies and ministries, captains of industry, and scientific community leaders attended the dinner.

Highlights of the evening were the Prime Minister's Annual Address to the Academy, the President's address and the conferment of certificates to six new Fellows by the Rt Hon. Prime Minister of Malaysia, Dato' Seri Dr Mahathir Mohamad. The Annual Address delivered by the Prime Minister stated among others the need to document all breakthroughs in various fields of SET; a challenge for the Malaysian scientific community to produce a Nobel Laureate by the Year 2020; the government continuing to seek opinions and suggestions from the Academy on SET issues; the Academy becoming a platform for scientists, engineers and technologists to channel their inputs and views into the national development process and at the same time to provide co-ordination and direction to the scientific community; and the Academy continuing playing the advisory role on SET to the Government as well as to the private sectors.



Fellow-Fellow baru Akademi sedang menerima sijil perlantikan dari YAB Dato' Dr Mahathir Mohamad
New Fellows of the Academy receiving their certificates of fellowship from YAB Dato' Dr Mahathir Mohamad

Aktiviti-aktiviti
1998
Activities

Akademi Sains Malaysia telah mengenalpasti 5 bidang fokus utama iaitu:

- Memberi nasihat kepada Kerajaan mengenai perkara-perkara yang berkepentingan nasional
- Merangsang budaya kecemerlangan dalam bidang sains, kejuruteraan dan teknologi di Malaysia
- Membantu untuk meningkatkan keupayaan industri di Malaysia dalam bidang teknologi
- Menggalakkan kesedaran umum tentang kepentingan sains, kejuruteraan dan teknologi dalam kehidupan seharian
- Rangkaian dan Kerjasama Antarabangsa

The Academy of Sciences Malaysia has identified 5 major areas of focus including:

- *Providing advice to Government on matters of national importance*
- *Fostering a culture of excellence in science, engineering and technology in Malaysia*
- *Assisting in upgrading technological capability in Malaysian industry*
- *Promoting public awareness of the importance of science, engineering and technology in everyday life*
- *International Networking and Collaboration*

Aktiviti-aktiviti 1998
Activities in 1998

Nasihat kepada kerajaan
Advice to Government

Salah satu daripada peranan utama Akademi adalah memberi nasihat kepada Kerajaan di dalam perkara-perkara berkaitan dengan sains, kejuruteraan dan teknologi dari masa ke semasa. Sejajar dengan fungsi ini, Akademi mengenal-pasti 4 bidang fokus bagi tahun 1998 seperti berikut :

- Pertanian dan Ekonomi Berasaskan Sumber
- Biodiversiti
- Pendidikan Sains
- Pengurusan Sumber Asli

Dalam tahun 1998, Akademi memajukan 2 laporan kajian kepada Kerajaan.

One of the main roles of the Academy is to advise Government on matters related to science, engineering and technology from time to time. In line with this role, it identified for 1998 4 areas of focus as follows:

- *Agriculture and Other Resource-based Economies*
- *Biodiversity*
- *Science Education*
- *Natural Resource Management*

In 1998, the Academy submitted 2 study reports to the Government.



Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. dan Fellow Akademi sedang berbincang mengenai laporan Akademi bersama YB Datuk Law Hieng Ding, Menteri Sains, Teknologi dan Alam Sekitar

Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. and Fellows of the Academy discussing the report with YB Datuk Law Hieng Ding, Minister of Science, Technology and the Environment

PENGURUSAN SUMBER ASLI MALAYSIA : SUATU PENDEKATAN BERSEPADU

Laporan yang bertajuk *"Malaysia's Natural Resources Management : An Integrated Approach"* telah dimajukan kepada YB Datuk Law Hieng Ding, Menteri Sains, Teknologi dan Alam Sekitar. Pembentangan laporan dibuat oleh YBhg Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc., Presiden Akademi Sains Malaysia dan Encik Fateh Chand F.A.Sc., Ahli Majlis Akademi. Laporan ini mengandungi cadangan dan perakuan yang dibuat oleh Akademi untuk pengurusan sumber

MALAYSIA'S NATURAL RESOURCES MANAGEMENT : AN INTEGRATED APPROACH

A study report entitled "Malaysia's Natural Resources Management : An Integrated Approach" was presented to YB Datuk Law Hieng Ding, Minister of Science, Technology and the Environment. The presentation was done by YBhg Tan Sri Dato' Omar Abdul Rahman F.A.Sc., President of the Academy and Encik Fateh Chand F.A.Sc., Council Member of the Academy. This study report encompasses the recommendations of the Academy for the proper management of

asli yang menggunakan pendekatan bersepadu berbanding dengan pendekatan sektoral. Selepas taklimat, adalah dipersetujui untuk laporan ini dimajukan kepada Jawatankuasa Perancangan Pembangunan Negara (JPPN). Berlanjutan dari itu, laporan tersebut kemudiannya telah dimajukan kepada JPPN semasa satu mesyuarat yang diadakan dan juga kepada Unit Perancangan dan Penyelerasan (UPP) Jabatan Perdana Menteri semasa dua mesyuarat berikutnya. UPP telah dipertanggungjawabkan untuk mencari satu mekanisma untuk melaksanakan cadangan-cadangan yang diperakukan di dalam laporan.

natural resources using an integrated approach as opposed to a sectoral approach. After the briefing, it was agreed that the report be forwarded to the National Development Planning Council (NDPC). The study report was then presented to NDPC at a meeting and also to the Implementation and Co-ordination Unit (ICU) of the Prime Minister's Department at the two subsequent meetings. ICU has been given the responsibility to find the mechanism to implement the recommendations of the report.

KRISIS AIR : KEPERLUAN KE ARAH PENGURUSAN SUMBER AIR SECARA BERSEPADU DI MALAYSIA

Ini adalah satu laporan khas yang dimajukan kepada Kerajaan mengenai krisis air pada tahun 1998. Akademi memajukan cadangannya untuk pertimbangan Kerajaan tentang bagaimana untuk mengatasi krisis air daripada ianya berulang semula melalui pendekatan pengurusan sumber air yang bersepadu. Di antara cadangan-cadangan yang dikemukan oleh Akademi adalah

THE WATER CRISIS : A COMPELLING CASE FOR INTEGRATED WATER RESOURCES MANAGEMENT IN MALAYSIA

This is a special report to the Government on the Water Crisis in 1998. The Academy put forward recommendations for consideration of the Government on how to overcome the Water Crisis and prevent its reoccurence through an integrated water resources management approach. Amongst the recommendations by the Academy are the immediate adoption and implementation of

penerimaan dan perlaksanaan dengan kadar segera Pengurusan Sumber Air Secara Bersepadu atau *Integrated Water Resources Management* (IWRM) sebagai strategi polisi utama bagi pengurusan sektor air di Malaysia, menyokong penuh penubuhan Majlis Air Negara dan bagi Majlis untuk menggubal polisi air negara bagi menyatukan polisi sektoral dan sektoral kecil yang sekarang ini berpecah untuk menjadi satu yang koheren di dalam rangka menyeluruh IWRM, dan perlaksanaan satu pengurusan *'system-wide'* bagi memastikan kecekapan dan ekuiti wujud di dalam sektor air.

Integrated Water Resources Management (IWRM) as the central policy and strategy for managing the water sector in Malaysia; fully supports the establishment of the National Water (Resources) Council and for the Council to formulate a national water policy bringing together current fragmented sectoral and sub-sectoral policies into a coherent whole within the overall framework of IWRM, and implementation of a system-wide management to ensure both efficiency and equity in the water sector.

DESIGNING SCIENCE EDUCATION FOR COMPETITIVENESS : RECOMMENDATIONS ON MEASURES TO INCREASE STUDENT ENROLMENT IN SCIENCE IN MALAYSIA

Menyedari hakikat bahawa penglibatan pelajar di dalam bidang Sains semakin menurun, pihak Akademi telah mengambil inisiatif untuk menyediakan laporan kajian yang meninjau isu dan masalah pendidikan sains yang mendatangkan kesan terhadap penurunan minat pelajar mengikuti bidang sains. Laporan ini mengkaji

DESIGNING SCIENCE EDUCATION FOR COMPETITIVENESS : RECOMMENDATIONS ON MEASURES TO INCREASE STUDENT ENROLMENT IN SCIENCE IN MALAYSIA

Realizing the fact that the student enrolment in Science is alarmingly low, the Academy took the initiative to come up with a study report to look into issues and problems of science education which resulted in the declining interest of students taking science. This report examines common viewpoints generally expressed by educators

pandangan yang diluahkan oleh para pengajar dan pihak pentadbir serta hasil penyelidikan yang ada. Ia juga mengkaji terutamanya kurikulum sekolah. Diantara cadangan yang diutarakan adalah penggubalan *National Science Education Standards* yang akan memberi garis panduan yang komprehensif bagi meningkatkan imej dan status pendidikan sains dan penubuhan Majlis Pendidikan Sains dan Teknologi Kebangsaan. Laporan ini akan dimajukan kepada Menteri Pendidikan Malaysia pada tahun 1999.

and administrators as well as findings from available research. In particular, it also examines the school curriculum. Among the recommendations put forward are the adoption of National Science Education Standards which will provide comprehensive guidelines to shore up the image and status of science education and the establishment of a National Council for Science and Technology Education. This report will be presented to the Minister of Education in 1999.

DIALOG DI ANTARA YBHG TAN SRI ABDUL HALIM ALI, KETUA SETIAUSAHA NEGARA DENGAN AKADEMI SAINS MALAYSIA

Satu sesi dialog telah diadakan di antara YBhg Tan Sri Abdul Halim Ali, Ketua Setiausaha Negara dengan Akademi pada 29 Jun 1998 semasa lawatan beliau ke Akademi. Ia telah dihadiri oleh 27 Fellows Akademi dan dipengerusikan oleh Presiden Akademi, YBhg Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. Encik Cheah Kong Wai, Ketua Setiausaha Kementerian Sains, Teknologi dan Alam Sekitar turut hadir bersama. Semasa sesi dialog beberapa isu

DIALOGUE BETWEEN YBHG TAN SRI ABDUL HALIM ALI, CHIEF SECRETARY TO THE GOVERNMENT AND THE ACADEMY OF SCIENCES MALAYSIA

A dialogue was held between YBhg Tan Sri Abdul Halim Ali, Chief Secretary to the Government and the Academy on 29th June 1998 during his visit to the Academy. This was attended by 27 Fellows of the Academy and chaired by the President, YBhg Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. Mr Cheah Kong Wai, the Secretary General of the Ministry of Science, Technology and the Environment was also present. During the dialogue a number of issues were

telah dibangkitkan. Diantaranya adalah peranan Akademi di masa hadapan; memudahkan aktiviti-aktiviti penyelidikan sains kejuruteraan dan teknologi antarabangsa di Malaysia; kesulitan untuk mengkomersilkan hasil penyelidikan; pengambilan saintis negara lain; perwakilan dan keahlian ASM di Organisasi-organisasi dan Perkumpulan Saintifik Malaysia dan Antarabangsa dan keperluan kewangan jangka panjang ASM.

Akademi akan memajukan beberapa kertas cadangan untuk menangani isu-isu tersebut. Diantara cadangannya adalah penubuhan Industry Specific S&T Research Fund bagi fungsi-fungsi koordinatif yang dapat dimainkan oleh Akademi untuk memastikan bahawa tindakan susulan terhadap Perjanjian Persefahaman di dalam bidang S&T dengan negara-negara lain dapat dilaksanakan; penggubalan polisi yang standard, garis panduan dan mekanisma perlaksanaan untuk menangani kesulitan mengkomersilkan hasil penyelidikan.

raised. Amongst the issues were the future role of the Academy; facilitating Malaysian international science, engineering and technology research activities, difficulties to commercialize research findings; hiring of foreign scientists; ASM representation and membership in Malaysian and International Scientific Organizations and Groupings and ASM long term financial requirements.

The Academy will submit a number of proposals to address the issues. Amongst the proposals are on the setting up of an Industry Specific S&T Research Fund; on the co-ordinative functions that the Academy can play in ensuring that follow up of S&T MOUs signed with other countries is being carried out; on the establishment of standard policy, guidelines and mechanism of implementation to address the difficulties in the commercialization of research findings.

Tan Sri Abdul Halim Ali bersama Fellow Akademi Sains Malaysia
Tan Sri Abdul Halim Ali with ASM Fellows



Program Kecemerlangan Sains
Science Excellence Programme

Program Kecemerlangan Akademi Sains Malaysia adalah bertujuan untuk menanam budaya cemerlang di dalam bidang sains, kejuruteraan dan teknologi di dalam masyarakat kita. Tahun 1998 telah menyaksikan pelbagai aktiviti menarik dilaksanakan oleh Akademi di bawah program ini. Sebagai ringkasan, Akademi telah menganjurkan satu syarahan perdana, satu syarahan umum, satu forum, melancarkan Tabung Penyelidikan Perubatan Dr Ranjeet Bhagwan Singh dan Syarahan Peringatan Perdana dan menganjurkan satu Perbincangan Mejabulat mengenai Alam Sekitar.

The Academy's Science Excellence Programme is aimed to inculcate a culture of excellence in science, engineering and technology in our society. The year 1998 saw many interesting activities being carried out by the Academy under this programme. In summary, the Academy held an annual oration, a public lecture, a forum, launched the Dr Ranjeet Bhagwan Singh Medical Research Fund and the Inaugural Memorial Lecture and organized a Roundtable Discussion on Environment.

SYARAHAN PERDANA ASM 1998

Akademi telah menganjurkan Syarahan Perdana 1998 di Bilik Gerakan, Kementerian Kerja Raya Malaysia pada 2 Oktober 1998. Lebih kurang 60 tetamu menghadiri syarahan tersebut. Syarahan yang bertajuk *"Recent Development in Vibrational Spectroscopy of Ionic Clusters"* telah disampaikan oleh Prof. Lee Yuan Tseh, Presiden Academia Sinica Taiwan dan Pemenang Anugerah Nobel 1986 dalam bidang Kimia.

ASM ANNUAL ORATION 1998

The Academy held its1998 Annual Oration at the Bilik Gerakan, Ministry of Works Malaysia on 2nd October 1998. About 60 invited guests attended the oration. The oration entitled "Recent Development in Vibrational Spectroscopy of Ionic Clusters" was delivered by Prof Lee Yuan Tseh, President Academia Sinica Taiwan and Nobel Laureate in Chemistry in 1986.



Prof Lee Yuan Tseh menyampaikan Syarahan Perdana
Prof Lee Yuan Tseh delivering the Annual Oration

Syarahan ini memaparkan secara terperinci dinamik reaksi awal yang ringkas yang mana secara teori adalah penting untuk membongkar mekanisma reaksi kimia proses fotokimia yang kompleks yang memainkan banyak peranan penting di dalam proses-proses makroskopik.

SYARAHAN UMUM ASM

Akademi dengan kerjasama Universiti Malaya telah menganjurkan satu syarahan umum bertajuk *"The Impact of Understanding Chemical Reaction Mechanism to Our Living Environment"* yang telah disampaikan oleh Prof Lee Yuan Tseh Presiden Academia Sinica Taiwan dan Pemenang Anugerah Nobel 1986 dalam bidang Kimia. Syarahan ini membincangkan bidang reaksi kimia dinamik yang menggunakan teknik-teknik pancaran molekul dan laser dan implikasi kajian ini ke atas pemahaman tentang kimia atmosferik, terutamanya masalah-masalah yang berkaitan dengan kehilangan ozon.

The oration elucidated detailed dynamics of simple elementary reactions that are theoretically important to unravel the mechanism of complex chemical reaction of photochemical processes that play important roles in many macroscopic processes.

ASM PUBLIC LECTURE

The Academy in collaboration with University of Malaya organised the ASM Public Lecture entitled "The Impact of Understanding Chemical Reaction Mechanism to Our Living Environment" which was delivered by Prof Lee Yuan Tseh, President, Academia Sinica Taiwan and 1986 Nobel Laureate in Chemistry. This lecture discussed the exciting field of chemical reaction dynamic using molecular beam and laser techniques and the implications of these studies to the understanding of atmospheric chemistry, especially problems related to ozone depletion.



Prof Lee Yuan Tseh menerima cendermata dari Timbalan Naib Cancellor Universiti Malaya
Prof Lee Yuan Tseh receiving a souvenir from the Deputy Vice Chancellor University of Malaya

PELANCARAN TABUNG PENYELIDIKAN PERUBATAN DR RANJEET BHAGWAN SINGH DAN INAUGURAL MEMORIAL LECTURE

Mendiang Dr Ranjeet Bhagwan Singh telah mewasiatkan untuk menubuhkan Tabung Penyelidikan Perubatan Dr Ranjeet Bhagwan Singh . Tabung ini ditubuhkan untuk menggalakkan penyelidikan di kalangan saintis perubatan muda untuk kebaikan negara.

Pada 16 Julai 1998 Tabung Penyelidikan Perubatan Dr Ranjeet Bhagwan Singh dan Syarahan Peringatan Perdana telah dirasmikan oleh YB Datuk Law Hieng Ding, Menteri Sains, Teknologi dan Alam Sekitar di Institut Penyelidikan Perubatan Malaysia. Tabung ini digerakkan pada tahun 1997 apabila dua penerima dianugerahkan geran. Untuk tahun 1998, Akademi telah memilih 2 orang lagi penerima. Mereka adalah Cik Lian Lay Hoong dan Prof Madya Dr Hoh Hin Bing dari Universiti Malaya. Masing-masing menerima RM29,000 dan RM14,000. 300 tetamu daripada universiti tempatan, institut penyelidikan perubatan dan komuniti saintifik Malaysia menghadiri majlis pelancaran dana dan syarahan. Syarahan yang bertajuk *"Millennial Challenges in Communicable Disease Control"* telah disampaikan

LAUNCHING OF DR RANJEET BHAGWAN SINGH MEDICAL RESEARCH FUND AND INAUGURAL MEMORIAL LECTURE

The Dr Ranjeet Bhagwan Singh Medical Research Fund was established as a result of a bequest by the late Dr Ranjeet Bhagwan Singh. The fund was established to promote research among young medical scientists for the benefit of the nation.

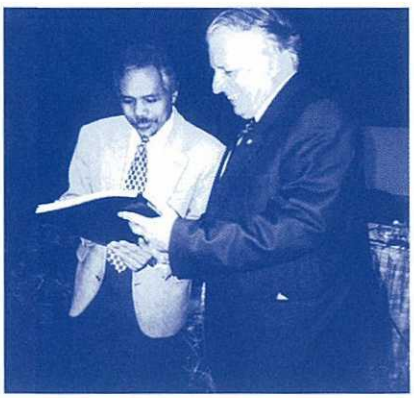
On 16th July 1998 the Dr Ranjeet Bhagwan Singh Medical Research Fund and the Inaugural Memorial Lecture were officially launched by YB Datuk Law Hieng Ding, Minister of Science, Technology and the Environment, Malaysia at the Institute for Medical Research Malaysia (IMR). The fund was activated in 1997 when the first two recipients received their grants. For 1998 the Academy selected two more recipients. They were Ms Lian Lay Hoong and Assoc. Prof Dr Hoh Hin Bing from University of Malaya. They received RM29,000 and RM14,000 respectively. 300 guests from local universities, medical research institutes and Malaysian SET community attended the launching of the fund and the Inaugural Memorial Lecture. The lecture entitled "Millennial Challenges

YB Datuk Law Hieng Ding di Majlis Pelancaran Tabung Penyelidikan Perubatan Dr Ranjeet Bhagwan Singh
YB Datuk Law Hieng Ding at the launching of Dr Ranjeet Bhagwan Singh Medical Research Fund





YB Datuk Law Hieng Ding, President ASM dan Prof Gustav Nossal bersama pemenang Geran Penyelidikan Dr Ranjeet Bhagwan Singh
YB Datuk Law Hieng Ding, President ASM and Prof Gustav Nossal with the winners of Dr Ranjeet Bhagwan Singh Research Grant



Prof Emeritus Sir Gustav Nossal menerima cenderamata daripada Timbalan Naib Canselor Universiti Malaya Prof Datuk Dr Osman Bakar

Prof Emeritus Sir Gustav Nossal receiving a gift from the Deputy Vice Chancellor University of Malaya Prof Datuk Dr Osman Bakar

oleh Prof. Emeritus Sir Gustav Nossal, Bekas Presiden Australian Academy of Sciences (AAS).

Akademi dan Universiti Malaya telah menganjurkan Syarahan Umum Dr Ranjeet Bhagwan Singh di Perdanasiswa, Universiti Malaya pada 15 Julai 1998. Syarahan yang bertajuk *"New Frontiers in Science and Medicine"* disampaikan oleh Prof Emeritus Sir Gustav Nossal. Seramai lebih kurang 400 tetamu dari universiti tempatan termasuk pelajar dan pensyarah menghadiri syarahan umum tersebut.

in Communicable Disease Control" was delivered by Prof Emeritus Sir Gustav Nossal, Past President of the Australian Academy of Sciences (AAS).

The Academy and University of Malaya organized the Dr Ranjeet Bhagwan Singh Public Lecture at Perdanasiswa, University of Malaya on 15th July 1998. Prof Emeritus Sir Gustav Nossal delivered the lecture entitled "New Frontiers in Science and Medicine". About 400 guests from local universities including students and lecturers attended the lecture.

FORUM "THE ROLE OF SCIENTISTS IN MALAYSIA – TOWARDS EXCELLENCE IN RESEARCH"

Akademi bersama-sama dengan Suruhanjaya Sains dan Teknoogi – Majlis Pertubuhan Wanita Kebangsaan telah meng-anjurkan satu Forum yang bertajuk *"The Role of Scientists in Malaysia – Towards Excellence in Research"* pada 5 Disember 1998. Lebih kurang 100 peserta menghadiri forum yang dipengerusikan oleh Prof Farida Habib Shah, Pengerusi Suruhanjaya S & T Majlis Pertubuhan Wanita Kebangsaan.

Empat panelis telah dijemput ke forum tersebut. Panelis pertama YBhg Dato' Mohamad Ridzuan

FORUM ON "THE ROLE OF SCIENTISTS IN MALAYSIA – TOWARDS EXCELLENCE IN RESEARCH"

The Academy and the Science and Technology Commission of the National Council of Women Organizations (NCWO) jointly organized a Forum on "The Role of Scientists in Malaysia – Towards Excellence in Research" on 5th December 1998. About 100 participants attended the forum which was chaired by Prof. Farida Habib Shah, Chairman of S&T Commission of NCWO.

Four panelists were invited to speak at the forum. The first panelist Dato' Dr Muhamad Ridzuan Salleh F.A.Sc.,

Salleh F.A.Sc., Pengerusi Jawatankuasa Kecil IRPA dalam Kejuruteraan Sains bercakap mengenai *"The Role of Government in Setting Directions Towards Excellence in Research"*. Sebagai panelis kedua, YBhg Prof Dato' Dr Syed Jalaluddin Syed Salim F.A.Sc. , Naib Canselor Universiti Putra Malaysia bercakap mengenai *"Incentives and Motivations Provided by Institutes of Higher Learning in Promoting Research"*. Panelis ketiga, Dr Choong Chok Ngee, Naib Presiden P & P Sirim bercakap mengenai *"Strategic Alliances Between Private and Public Sector Research – How Effective Is It?"* dan Puan Zam Karim, Timbalan Pengarah, Sains dan Teknologi Kementerian Sains, Teknologi dan Alam Sekitar bercakap mengenai *"Issues of Research Funding – With Focus on Fundamental Research"*.

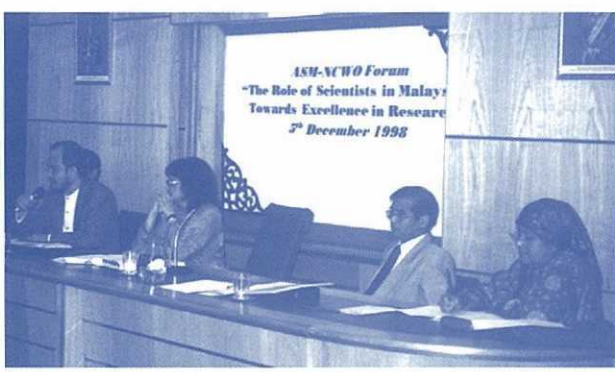
Forum telah membincangkan faktor-faktor bagaimana untuk mencapai kecemerlangan di dalam penyelidikan. Hasil yang diperolehi daripada forum ini akan digunakan oleh Akademi sebagai input untuk menyediakan satu kertas cadangan bagaimana untuk mencapai kecemerlangan di dalam bidang sains, kejuruteraan dan teknologi.

Chairman of IRPA Sub-Committee on Engineering Sciences talked about "The Role of Government in Setting Directions Towards Excellence in Research" . As the second panelist, Prof Tan Sri Dato' Dr Syed Jalaluddin Syed Salim F.A.Sc., Vice-Chancellor of Universiti Putra Malaysia talked about "Incentives and Motivations Provided by Institutes of Higher Learning in Promoting Research". The third panelist, Dr Chong Chok Ngee, Vice President, R&D SIRIM talked about "Strategic Alliances Between Private and Public Sector Research – How Effective Is It?" and Puan Zam Karim, Deputy Director, Science and Technology, Ministry of Science, Technology and the Environment, the fourth panelist, talked about "Issues of Research Funding – With Focus on Fundamental Research".

The forum discussed the factors on how to achieve excellence and factors that motivate scientists to attain excellence in research. The output from the forum will be used by the Academy as input to develop a proposal on how to achieve excellence in SET.



Peserta yang menghadiri Forum
Participants attending the Forum



Pengerusi dan Ahli-ahli Panel Forum
Chairperson and panellists of the Forum

PERBINCANGAN MEJABULAT ASM TENTANG ALAM SEKITAR: PERUBAHAN CUACA DAN IMPLIKASI JANGKA PANJANG KE ATAS AGENDA SAINS MALAYSIA

Jawatankuasa Kerja Alam Sekitar Akademi memulakan satu proses untuk merumuskan satu *"Science Agenda on Climate Change for Malaysia"*. Agenda Sains ini adalah sebagai rangka tindakan bagi penyelidikan perubahan cuaca di Malaysia. Pada 21 Disember 1998 seramai 25 saintis dan penggubal polisi telah menghadiri perbincangan mejabulat yang pertama ini untuk membincangkan Agenda ini. Mejabulat ini dipengerusikan oleh Encik Fateh Chand F.A.Sc., Pengerusi Jawatankuasa Kerja Alam Sekitar. Empat ahli panel dijemput untuk memberi latar-belakang dan gambaran keseluruhan yang ringkas tentang keadaan sekarang. Encik Chow Kok Kee, Pengerusi *Subsidiary Body on Scientific, Technical and Technological Advise (SBSTTA), United Nations Frame Work Convention on Climate Change (UNFCCC)* dan *Malaysia's Principal Negotiator* ke UNFCCC membentangkan kertas kerja mengenai sejarah UNFCCC dan tren global tentang sains perubahan cuaca. Encik Azman Zainal Abidin dari Universiti Putra

ASM ROUNDTABLE DISCUSSION ON ENVIRONMENT: CLIMATE CHANGE AND LONG-TERM IMPLICATION ON MALAYSIA'S SCIENCE AGENDA

The Working Committee on Environment of the Academy initiated a process to formulate a Science Agenda on Climate Change for Malaysia. The Science Agenda is intended to serve as a blueprint for Climate Change research in Malaysia. On 21st December 1998 about 25 scientists and policy makers attended the first Roundtable to discuss the Agenda. The Roundtable was chaired by Mr Fateh Chand F.A.Sc., Chairman of the Working Committee on Environment. Four panel speakers were invited to give a background and brief overview of the present situation. Mr Chow Kok Kee, Chairman of Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), of United Nations Frame Work Convention on Climate Change (UNFCCC) and Malaysia's Principal Negotiator to the UNFCCC presented a paper on history of UNFCCC and the global trend on the science of climate change. Mr Azman Zainal Abidin

Malaysia membincangkan tentang Gas Rumah Hijau di Malaysia, sumber-sumbernya dan kawah.

Dr Chan Ah Kee, Pengarah, *Meteorological Services Malaysia* mengunjurkan satu senario cuaca jangka panjang dan mengenalpasti beberapa bidang bagi campur tangan saintifik sementara Encik Chong Ah Look, Visiting Fellow dari *Institute of Strategic and International Studies (ISIS)* bercakap mengenai percubaan ISIS untuk menghasilkan *National Response Strategies on Climate Change.*

Perbincangan yang berikutnya adalah bertumpu kepada keperluan untuk menumpukan perhatian kepada penyelidikan tentang cuaca di Malaysia, menyediakan fakta-fakta tentang keadaan cuaca di Malaysia dan kawasan berhampiran kerana model global yang ada sekarang gagal untuk mengesan reaksi cuaca tempatan terhadap perubahan yang berlaku. Sumber-sumber dan kapasiti saintis tempatan juga dibincangkan. Beberapa peserta yang hadir mencadangkan untuk menubuhkan satu Pusat Cuaca di Malaysia dengan tujuan untuk menjana sumber-sumber terhad yang ada dan untuk menerajui penyelidikan tentang cuaca di Malaysia.

of Universiti Putra Malaysia spoke on the Greenhouse Gases in Malaysia, its sources and sinks.

Dr Chan Ah Kee, Director, Meteorological Services Malaysia projected a long term climate scenario in Malaysia and identified several possible areas for scientific intervention while Mr Chong Ah Look, Visiting Fellow of Institute of Strategic and International Studies (ISIS) spoke on the current attempt by ISIS to develop National Response Strategies on Climate Change.

The ensuing discussion was mainly focused on the need to concentrate on Climate Research in Malaysia, providing facts on climate behavior in Malaysia or the region as the present global model failed to capture the local climate reaction to changes. Resources and available capacity of the local scientists were also discussed. Several participants proposed establishing a Climate Centre in Malaysia to harness the limited resources available and to provide leadership to climate research in Malaysia.

Membantu untuk Meningkatkan Keupayaan Industri di Malaysia Dalam Bidang Teknologi

Assisting in Upgrading Technological Capability in Malaysian Industry

Salah satu bidang fokus Akademi adalah untuk membantu meingkatkan keupayaan industri di Malaysia dalam bidang teknologi. Di bawah bidang ini Akademi telah melibatkan diri di dalam beberapa aktiviti.

MESYUARAT DI ANTARA AHLI MAJLIS ASM DAN FMM

Akademi dan Persatuan Pekilang-pekilang Malaysia (FMM) bersetuju untuk mengadakan Forum ASM-FMM peringkat tinggi akan mengenalpasti isu-isu dan masalah yang melanda industri di Malaysia dan seterusnya merangka program-program tindakan untuk mengatasinya. Forum ASM-FMM akan memberi tumpuan kepada bidang fokus berikut :

- Untuk menjalankan proses *"strategic thinking"* bagi memperbaik struktur dan pengurusan teknologi di Malaysia dengan penekanan ke atas penerapan teknologi ke dalam pembangunan industri
- Untuk meingkatkan sistem pengeluaran dengan memeriksa proses-proses terlibat
- Untuk mengenalpasti *"niche areas"* untuk kerjasama dan usaha sama

One of the Academy's major area of focus is assisting in upgrading technological capability in Malaysian industry. Under this thrust area the Academy had involved itself in several activities.

HIGH-LEVEL ASM-FMM FORUM

The Academy and the Federation of Malaysian Manufacturers (FMM) agreed to the establishment of a high-level ASM-FMM Forum which would identify issues and problems affecting the Malaysian industries and develop programmes of action to overcome them. The ASM-FMM Forum emphasises the following areas of focus :

- *To undertake a strategic thinking exercise to improve the structure and technology management in Malaysia with particular emphasis on the infusion of technology into industrial development*
- *To improve the production systems by examining the processes*
- *To identify niche areas for mutual cooperation and collaboration*

- Untuk menilai kesan sains, kejuruteraan dan teknologi ke atas masyarakat

Persetujuan ini telah dicapai semasa pertemuan yang diadakan diantara Ahli Majlis ASM dan ahli Majlis FMM pada 2 Jun 1998. Delegasi dari Akademi diketuai oleh Presidennya, Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. manakala delegasi daripada FMM diketuai oleh Presidennya, Dato' Paul Low.

MESYUARAT KUMPULAN RANGKAIAN KERJASAMA PRODUKTIVITI PERSATUAN PEKILANG-PEKILANG MALAYSIA (FMM)

Akademi telah dijemput untuk menjadi ahli Kumpulan Rangkaian Kerjasama Produktiviti FMM. Kumpulan Rangkaian Kerjasama ini ditubuhkan untuk membincangkan dan berkongsi pengalaman mengenai masalah, isu-isu dan penyelesaian berkaitan dengan peningkatan produktiviti di peringkat korporat dan kilang; untuk mengenalpasti amalan yang terbaik dan menyebarkan amalan tersebut supaya wujud perpindahan teknologi diseluruh sektor industri Malaysia dan untuk memastikan

- *To assess the impact of science, engineering and technology on society*

The agreement was achieved during a meeting between ASM Council and FMM Council whih was held on 2nd June 1998. The delegation from the Academy was led by its President, Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. and delegation from the Federation of Malaysian Manufacturers (FMM) was led by its President, Dato' Paul Low.

FEDERATION OF MALAYSIAN MANUFACTURERS (FMM) NETWORKING GROUP ON PRODUCTIVITY

The Academy was invited to be a member of the FMM Networking Group on Productivity. This Networking Group was set up to discuss and share experiences concerning problems, issues and solutions on productivity enhancement at corporate and factory levels; to identify best practices and disseminate such practices so that there is a transfer of knowledge throughout the Malaysian industrial sector and to keep members abreast of productivity trends, technology and



Mesyuarat di antara Ahli Majlis ASM dan FMM
Meeting between Members of ASM and FMM Councils

ahli-ahli mengikuti arah aliran produktiviti, teknologi dan amalan, teknik-teknik atau cara-cara pengurusan. Kumpulan ini dijangka akan mengadakan pertemuan sekali pada setiap tiga bulan.

Satu mesyuarat Kumpulan Rangkaian Kerjasama Produktiviti FMM telah diadakan pada 14 Julai 1998 bertempat di Bilik Majlis FMM. 29 peserta dari industri, Pusat Produktiviti Kebangsaan (PPK), Perbadanan Pembangunan Industri Kecil dan Sederhana (SMIDEC), Akademi Sains Malaysia (ASM), Kongres Kesatuan Sekerja Malaysia (MTUC) dan Kementerian Pembangunan Usahawan telah menghadiri mesyuarat yang dipengerusikan oleh Presiden FMM, Datuk Paul Low.

management practices, techniques or methods. The Group is expected to meet once every three months.

A meeting of the FMM Networking Group on Productivity was held on 14th July 1998 at the Council Room of FMM. 29 participants from Industry, National Productivity Centre (NPC), Small and Medium Industries Development Corporation (SMIDEC), Academy of Sciences Malaysia (ASM), Malaysian Trade Union Coongress (MTUC) and the Ministry of Entrepreneur Development attended the meeting chaired by the President of FMM, Datuk Paul Low.

PENGGIATAN SEMULA SEKTOR PERTANIAN

Akademi dan Jawatankuasa Pertanian, Dewan Perniagaan dan Industri Cina (CCCI) Kuala Lumpur dan Selangor bersetuju untuk bekerjasama menjalankan kajian dan menghasilkan laporan bagaimana untuk menggiatkan semula sektor pertanian dengan fokus ke atas industri pengeluaran makanan. Persetujuan dicapai semasa mesyuarat yang diadakan

REVITALIZATION OF THE AGRICULTURE SECTOR

The Academy and the Agriculture Committee, the Chinese Chamber of Commerce and Industry (CCCI) of Kuala Lumpur and Selangor agreed to work together to undertake study and come up with a report on how to revitalize the agricultural sector with focus on food production industry. The agreement was achieved during a meeting held between the two

di antara kedua-dua organisasi pada 7 Disember 1998. CCCI diwakili oleh Encik Mew Jin Seng, Timbalan Presiden, Encik Kerk Loong Sing, Pengerusi Jawatankuasa Pertanian dan Encik Chang Ken Soo, Timbalan Setiausaha Eksekutif Jawatankuasa manakala Akademi diwakili oleh Pengarah Eksekutifnya, Dr Samsudin Tugiman.

organizations on 7th December 1998. The Chinese Chamber of Commerce and Industry (CCCI) was represented by Mr Mew Jin Seng, Vice President, Mr Kerk Loong Sing, Chairman, Agriculture Committee and Mr Chang Ken Soo, Deputy Executive Secretary of the Committee. The Academy was represented by its Executive Director, Dr Samsudin Tugiman.

Program Kesedaran Sains
Science Awareness Programme

Program Kesedaran Sains Akademi Sains Malaysia diwujudkan dengan tujuan untuk meningkatkan kesedaran dan kefahaman mengenai peranan penting yang dimainkan oleh sains, kejuruteraan dan teknologi di dalam ekonomi Malaysia dan kehidupan masyarakat dan juga untuk menerapkan budaya sains di dalam masyarakat kita. Akademi telah menganjurkan pelbagi aktiviti menarik di bawah program ini sepanjang tahun 1998.

The Academy's Science Awareness programme was established with the aim to increase awareness and understanding of the central role which science, engineering and technology play in Malaysia's economic and social well-being and also to develop a scientific culture in the society. The Academy has organised many interesting events under this programme during the year 1998.

SIRI SYARAHAN ASM: SYARAHAN PETROSAINS-ASM 1998

Akademi mengambil initiatif untuk menganjurkan Siri Syarahan Akademi Sains Malaysia di bawah Program Kesedaran Sains. Objektif program ini adalah untuk mencabar dan memberi inspirasi kepada golongan muda untuk memilih kerjaya di dalam bidang sains, kejuruteraan dan teknologi dan untuk merangsang mereka sebagai pemimpin di dalam bidang

ASM LECTURE SERIES: PETROSAINS-ASM 1998 LECTURE

The Academy took the initiative to organize the Academy of Sciences Malaysia Lecture Series under its Science Awareness Programme. The objective of the lecture is to challenge and inspire young people to pursue careers in science, engineering and technology and to stimulate them to become leaders



YB Datuk Khalid Yunus, Timbalan Menteri Pendidikan bersama pelajar-pelajar semasa majlis pelancaran Syarahan Petrosains – ASM
YB Datuk Khalid Yunus, Deputy Minister of Education with the students during the launching of the Petrosains – ASM Lecture

ini. Suatu Perjanjian Persefahaman mengenai pengorganisasian syarahan PETROSAINS – ASM 1998 telah ditandatangani di antara PETRONAS – Akademi pada 15 Mac 1998. PETROSAINS telah bekerjasama rapat dengan Akademi dalam implementasi dan pengurusan syarahan.

Syarahan yang bertajuk *"Syarahan PETROSAINS-ASM 1998"* memaparkan visual yang menarik, ceramah yang bertenaga, juga demonstrasi dan mengambil bahagian dalam sesi permainan.Tema syarahan adalah tentang industri minyak dan gas. Kumpulan sasar syarahan ini adalah pelajar berusia 15 –16 tahun.

Satu buku sumber yang bertajuk "Teroka" yang mengandungi pelan pembelajaran yang dicadangkan yang akan membantu guru-guru sains sekolah menengah di Malaysia untuk mengajarkan konsep syarahan diterbitkan dengan kerjasama Kementerian Pendidikan Malaysia.

Syarahan PETROSAINS-ASM 1998 telah dilancarkan pada 6 Oktober 1998 di Dewan Besar, Kementerian Kerja Raya oleh YB Dato' Khalid Yunus, Timbalan Menteri Pendidikan yang mewakili Menteri Pendidikan. Fasa I syarahan ini yang merangkumi Kuala Lumpur, Shah Alam,

in these fields. An MOU on the organization of PETROSAINS - ASM 1998 Lecture was signed between PETRONAS and the Academy on 15th March 1998. PETROSAINS was working very closely with the Academy in the implementation and management of the Lecture.

The lecture entitled "PETROSAINS-ASM 1998 Lecture" features lively talk, attractive visuals and demonstrations and participative game session. The theme of the lecture is the oil and gas industry. It is principally aimed at students in the age group of 15 – 16 years.

A learning kit of educational resources and suggested lesson plans entitled "Teroka" that aid secondary school science teachers in Malaysia to present the concepts of the lecture was also produced in collaboration with the Ministry of Education.

The PETROSAINS-ASM 1998 Lecture was successfully launched on 6th October 1998 at the Dewan Besar, Ministry of Works by YB Dato' Khalid Yunus, Deputy Minister of Education who represented the Minister of Education. Phase I of the lecture which covered Kuala Lumpur, Shah

Timbalan Presiden Pengurusan Sumber Teknologi Petronas Tuan Haji Mohd Zohari Shaharun menyerah cek kepada Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc.
Petronas Vice President, Technology Resource Management, Tuan Haji Mohd Zohari Shaharun handing over the cheque to Tan Sri Datuk Dr Omar Abdul Rahman F.S.c.







Sepintas lalu aktiviti Syarahan Petrosains – ASM
An Overview of activities at the Petrosains – ASM Lecture

Seremban, Ipoh, Johor Bharu dan Melaka telah selesai pada bulan Oktober 1998. Seramai lebih kurang 2600 pelajar dan 200 orang guru terlibat dalam program ini. Respon yang diterima daripada guru dan pelajar terlibat adalah sangat memberangsangkan. Syarahan ini dianggap menarik dan informatif. Fasa II syarahan ini yang akan diadakan di ibu negeri yang belum terlibat di Semenanjung Malaysia, Sabah dan Sarawak akan bermula pada bulan Mei 1999.

PROGRAM SYARAHAN KE SEKOLAH-SEKOLAH

Program Syarahan ke Bekas Sekolah-sekolah ini adalah salah satu aktiviti di bawah Program Kesedaran Sains Akademi. Pada 27 Mei 1998, Prof Looi Lai Meng F.A. Sc. telah berkunjung ke bekas sekolah beliau iaitu Sekolah Perempuan Bukit Bintang, Kuala Lumpur untuk menyampaikan syarahan yang bertajuk *"Cancer and Immortality"* dan berkongsi pengalaman kerjayanya dengan para pelajar. Lebih kurang 1200 pelajar Tingkatan Satu hingga Lima menghadiri syarahan tersebut. Syarahan diterbitkan oleh Akademi dan diedarkan kepada semua pelajar dan guru.



Prof Looi Lai Meng F.A.Sc. meyampaikan syarahan di Sekolah Menengah Permpuan Bukit Bintang
Prof Looi Lai Meng F.A.Sc. delivering her lecture at Bukit Bintang Girls's School

Alam, Seremban, Ipoh, Johor Bharu and Melaka was completed in October 1998. About 2600 students and 200 teachers were involved. The response from the students and teachers was overwhelming. The lecture was generally perceived as informative and interesting. Phase II of the lecture which will be held in the remaining state capitals in Peninsular Malaysia, Sarawak and Sabah will begin in May 1999.

ASM BACK TO SCHOOL LECTURE

This Back to School Lecture is part of the Academy's Science Awareness Programme. On 27th May 1998, Prof Looi Lai Meng F.A. Sc. went back to her "alma mater" Bukit Bintang Girls School Kuala Lumpur to deliver a lecture on "Cancer and Immortality" and to share her career experiences with the students. About 1200 Form One to Form Five students attended the lecture. The lecture was published by the Academy and distributed to all students and teachers.

SYARAHAN UMUM "ANTARTIKA" DI PUSAT SAINS NEGARA

Dato' Dr Salleh Mohd Nor F.A.Sc., menyampaikan syarahan bertajuk "Antartika – Benua Ke Enam" di Pusat Sains Negara pada 14 April 1998. Syarahan dihadiri oleh 150 pelajar sekolah menengah dari sekitar Lembah Kelang. Syarahan memberi maklumat latarbelakang mengenai Antartika, alam sekitarnya dan aktiviti-aktiviti saintifik yang dijalankan oleh para saintis.

PUBLIC LECTURE ON "ANTARCTICA" AT NATIONAL SCIENCE CENTRE

Dato' Dr Salleh Mohd Nor F.A.Sc., delivered a lecture on "Antarctica – The Sixth Continent" at the National Science Centre on 14th April 1998. The lecture was attended by about 150 secondary school students from the Klang Valley. The lecture provided background information about Antarctica, its environment and scientific activities carried out by scientists.

Program Antara-bangsa *International Programme*



YB Dato' Seri Rafidah Aziz, Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc., Dato' Ir Lee Yee Cheong F.A.Sc., Mr Sun Dayong dari CAST dan Ir Mazlan Mohamed dari IEM di majlis perasmian Mesyuarat Mejabulat

YB Dato' Seri Rafidah Aziz, Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc., Dato' Ir Lee Yee Cheong F.A.Sc., Mr Sun Dayong of CAST and Ir Mazlan Mohamed of IEM at the official opening of the Roundtable Meeting

Di bawah Program Antara-bangsa, Akademi telah menjalankan pelbagai aktiviti sepanjang tahun 1998.

PERSIDANGAN MEJABULAT SAINS, KEJURUTERAAN DAN TEKNOLOGI APEC

Satu Persidangan Mejabulat Sains, Kejuruteraan dan Teknologi APEC yang diadakan di Kuala Lumpur untuk membincangkan *"Agenda APEC untuk Kerjasama Industri Sains dan Teknologi dalam Abad Ke 21"* telah dianjurkan oleh Akademi, Persatuan Jurutera Malaysia (IEM) dan Persatuan Sains dan Teknologi China (CAST) dari 17 hingga 19 April 1998. Persidangan ini telah dirasmikan oleh Dato' Seri Rafidah Aziz, Menteri Perdagangan Antara-bangsa dan Industri Malaysia.

Objektif utama Persidangan Mejabulat ini adalah sebagai satu forum bagi para saintis, jurutera, industri dan penggubal polisi untuk membincangkan tentang isu-isu dan cabaran di dalam bidang sains, kejuteraan dan teknologi yang dihadapi oleh negara-negara APEC dalam abad ke 21. Cadangan dan perakuan yang lahir dari Persidangan Mejabulat ini dijadikan asas input dari Komuniti

Under the International Programme, the Academy has been actively involved in many activities during the year 1998.

APEC SCIENCE, ENGINEERING AND TECHNOLOGY ROUNDTABLE MEETING

An APEC SET Roundtable Meeting in Kuala Lumpur to discuss "APEC Agenda for Science and Technology Industry Co-operation into the 21st Century" was organized by the Academy , the Institution of Engineers Malaysia (IEM) and China Association of Science and Technology (CAST) from 17th to 19th April 1998. The meeting was officiated by the Honourable Dato' Seri Rafidah Aziz, Minister of International Trade and Industry, Malaysia.

The main objective of the Roundtable was to provide a forum for APEC scientists, engineers, industrialists and policy makers to deliberate on issues and challenges in science, engineering and technology confronting APEC member countries in the 21st century. The recommendations arising from the Roundtable formed the input from the APEC SET community to APEC Agenda on

APEC SET bagi Agenda Kerjasama Industri Sains dan Teknologi APEC Abad ke 21 untuk di terapkan Persidangan Para Pemimpin Ekonomi APEC di Kuala Lumpur pada bulan November 1998.

Persidangan selama tiga hari dihadiri oleh 56 delegasi dari Akademi-akademi Sains, Kejuruteraan dan Teknologi serta Organisasi yang Serupa dari 17 ahli ekonomi APEC. Persidangan yang di pengerusikan oleh Dato' Ir Lee Yee Cheong F.A.Sc., Setiausaha Agung Akademi itu berakhir pada 19 April 1998 dengan penggubalan Deklarasi dan Laporan semasa sesi plenari yang dipengerusikan oleh Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc., Presiden Akademi. Deklarasi itu kemudiannya di majukan kepada YB Dato' Seri Rafidah Aziz, Menteri

Science and Technology Industry Co-operation into the 21st Century to be adopted by the APEC Economic Leaders' Meeting in Kuala Lumpur in November 1998.

The three-day meeting was attended by 56 delegates from SET Academies and similar national bodies of 17 APEC member economies. The Roundtable Meeting was chaired by Dato' Ir Lee Yee Cheong F.A.Sc., Secretary General of the Academy. The Roundtable ended on the 19th April 1998 with the adoption of the Declaration and Report during the plenary session which was chaired by Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc., President of the Academy. The Declaration and Report was subsequently submitted to the Honourable Dato' Seri Rafidah Aziz, Minister of International Trade and Industry



Sepintas lalu di Mesyuarat Mejabulat
An overview of the Roundtable Meeting

Perdagangan Antarabangsa dan Industri Malaysia dan Pengerusi Mesyuarat Pengawai-Pengawai Kanan APEC (SOM).

Delegasi dari Akademi Sains, Kejuruteraan dan Teknologi dan Organisasi SET lain dari negara-negara rakan dialog ASEAN semasa pelancaran ASEAN-CASE di Hanoi
Delegates from ASEAN Academies of Sciences Engineering and Technology and sister SET Academies and Organisations from ASEAN Dialogue Partners during the launching of ASEAN-CASE in Hanoi





Para delegasi dari negara-negara ASEAN dan rakan dialog menghadiri Mesyuarat Tahunan di Hanoi
Delegates of ASEAN Academies and Dialogue Partners attending the Annual Meeting in Hanoi

MESYUARAT TAHUNAN 1998 AKADEMI SAINS, KEJURUTERAAN DAN TEKNOLOGI ASEAN DAN ORGANISASI NASIONAL YANG SERUPA DAN RAKAN DIALOG DARI AUSTRALIA, JEPUN, KOREA SELATAN DAN NEW ZEALAND

Mesyuarat Tahunan 1998 Akademi Sains, Kejuruteraan dan Teknologi ASEAN dan Organisasi Nasional yang Serupa, dan Rakan Dialog dari Australia, Jepun, Korea Selatan dan New Zealand telah diadakan pada 15 Oktober 1998 di *National Centre for Natural Sciences and Technology*, Hanoi. 20 peserta menghadiri mesyuarat tersebut yang telah dianjurkan bersama oleh Akademi. Akademi diwakili oleh Dr M.K. Rajakumar F.A.Sc., Timbalan Presiden, Dato' Ir Lee Yee Cheong F.A.Sc., Setiausaha Agung, Dr Samsudin Tugiman, Pengarah Eksekutif dan Encik Zahir Ismail, Pegawai Sains Kanan.

Kemuncak mesyuarat adalah persetujuan untuk menubuhkan ASEAN-CASE, untuk merangka satu mekanisma kerjasama masa hadapan diantara *ASEAN Secretariat for Functional Co-operation Bureau Malaysia (MITI) and the APEC Senior Official Meeting (SOM) Chair.*

1998 ANNUAL MEETING OF ASEAN SET ACADEMIES AND SIMILAR NATIONAL ORGANIZATIONS, AND DIALOGUE PARTNERS FROM AUSTRALIA, JAPAN, SOUTH KOREA AND NEW ZEALAND

The 1998 Annual Meeting of ASEAN SET Academies and Similar National Organizations, and Dialogue Partners from Australia, Japan, South Korea and New Zealand was held on 15th October 1998 at the National Centre for Natural Sciences and Technology, Hanoi. 20 participants attended the meeting, which was coorganised by the Academy. The Academy was represented by Dr M.K. Rajakumar F.A.Sc., Vice President, Dato' Ir Lee Yee Cheong F.A.Sc., Secretary General, Dr Samsudin Tugiman, Executive Director and Encik Zahir Ismail, Senior Scientific Officer.

The highlights of the meeting were the agreement to form ASEAN-CASE, to develop mechanism for future collaboration between ASEAN Secretariat for Functional Co-operation Bureau and ASEAN-CASE and to develop programs of co-

dan ASEAN-CASE dan untuk mengadakan program-program kerjasama di antara Akademi-akademi dari Jepun, Korea, Australia dan New Zealand serta Akademi Sains, Kejuruteraan dan Teknologi dan Organisasi Nasional yang Serupa dari ASEAN melalui ASEAN-CASE.

ASEAN-CASE atau *ASEAN Council of Academies of Sciences and Engineering* and Similar National Organisation adalah satu pertubuhan *"non-profit"* yang mempunyai minat di dalam bidang sains, kejuruteraan dan teknologi. Ia ditubuhkan oleh Akademi-akademi atau badan-badan sains, kejuruteraan dan teknologi kebangsaan negara-negara ASEAN. Objektifnya adalah untuk memberi nasihat yang adil dan seimbang kepada Sekretariat ASEAN dan badan-badan yang berkaitan dengan ASEAN mengenai penyelidikan, pembangunan dan teknologi yang dihasilkan untuk masa depan jangka pendek, sederhana dan panjang bagi ASEAN.

"Instrument" untuk menubuhkan ASEAN-CASE telah ditandatangani oleh wakil-wakil dari Akademi-akadmei Sains, Kejuruteraan dan Teknologi dari Malaysia, Indonesia, Filipina, Vietnam dan Thailand. Adalah juga dipersetujui bagi Akademi Sains Malaysia untuk menjadi sekretariat bagi ASEAN-CASE.

operation between Academies from Japan, Korea, Australia and New Zealand and SET Academies and Similar National Organisations from ASEAN through ASEAN-CASE.

ASEAN-CASE or ASEAN Council of Academies of Sciences and Engineering and Similar National Organisation is a non-profit association with science, engineering and technology interests. It is formed by Academies or similar national bodies of sciences, engineering and technology of member countries of ASEAN. Its objective is to provide impartial and balanced advice to the ASEAN-Secretariat and ASEAN instrumentalities concerning research, development and the resulting technology for the short, medium and long term future of ASEAN.

The instrument to form ASEAN-CASE was signed by representatives of Academies of Sciences, Engineering and Technology and Similar National Organisations from Malaysia, Indonesia, Philippines, Vietnam and Thailand. It was also agreed for the Academy of Sciences Malaysia to be the Secretariat of ASEAN-CASE.

INTERNATIONAL MEETING ON FRONTIERS OF PHYSICS (IMFP 98)

International Meeting on Frontiers of Physics (IMFP 98) diadakan di Kuala Lumpur dari 25 hingga 29 Oktober 1998. Ia dianjurkan bersama oleh Institut Fizik Malaysia, Akademi Sains Malaysia, Institut Fizik ASEAN, Bahagian Kajian Sains Angkasa, Kementerian Sains, Teknologi dan Alam Sekitar dan Jabatan Fizik, Universiti Malaya. Mesyuarat dirasmikan oleh YB Dato' Abu Bakar Daud, Timbalan Menteri Sains, Teknologi dan Alam Sekitar Malaysia. Objektif utama mesyuarat adalah untuk menyediakan satu forum untuk berinteraksi yang melibatkan penyelidik-penyelidik terkemuka dunia yang dapat merangsang dan meningkatkan minat terhadap *"Frontiers of Physics"* diseluruh kawasan Asia-Pasifik.

Seramai lebih kurang 200 peserta dari 11 buah negara menghadiri pertemuan ini dimana 150 kertas kerja telah dibentangkan.

INTERNATIONAL MEETING ON FRONTIERS OF PHYSICS (IMFP 98)

The International Meeting on Frontiers of Physics (IMFP 98) was held in Kuala Lumpur from 25th to 29th October 1998. It was co-organized by the Malaysian Institute of Physics, the Academy of Sciences Malaysia, the ASEAN Institute of Physics, the Space Science Studies Division, the Ministry of Science, Technology and the Environment and the Physics Department, University of Malaya. The meeting was officiated by YB Dato' Abu Bakar Daud, Deputy Minister of Science, Technology and the Environment, Malaysia. The main objective of the meeting was to provide a forum for interaction involving world renowned researchers who could stimulate and enhance interest in Frontiers of Physics throughout Asia-Pacific Region.

About 200 participants from 11 countries attended the meeting and about 150 papers were presented.

PERJANJIAN KERJASAMA DENGAN AUSTRALIAN ACADEMY OF SCIENCE (AAS) DAN AUSTRALIAN ACADEMY OF TECHNOLOGICAL SCIENCE AND ENGINEERING (ATSE)

Pada 23 November 1998, satu Perjanjian Kerjasama telah ditandatangani di Perth, Australia di antara Australian Academy of Science, Australian Academy of Technological Sciences and Engineering dan Akademi Sains Malaysia. Presiden ketiga-tiga Akademi menandatangani Perjanjian Kerjasama tersebut.

Perjanjian ini memberi peluang kepada Malaysia dan Australia untuk mengukuhkan kerjasama di dalam bidang sains, kejuruteraan dan teknologi melalui misi eksplorasi, lawatan sambil belajar dan bengkel yang dianjur bersama dan lain-lain program lagi.

CO-OPERATION AGREEMENT WITH AUSTRALIAN ACADEMY OF SCIENCE (AAS) AND AUSTRALIAN ACADEMY OF TECHNOLOGICAL SCIENCES AND ENGINEERING (ATSE)

On the 23rd November 1998, a Co-operation Agreement was signed in Perth, Australia between the Australian Academy of Science, the Australian Academy of Technological Sciences and Engineering and the Academy of Sciences Malaysia. The Presidents of the three Academies were the signatories of the Co-operation Agreement.

This agreement provides the opportunity for Malaysia and Australia to strengthen their collaboration in SET areas through study visits, exploratory missions and joint workshops etc.



Presiden-Presiden Australian Academy of Science (AAS), Australian Academy of Technological Science and Engineering (ATSE) dan Akademi Sains Malaysia menandatangani Perjanjian Kerjasama
Presidents of the Australian Academy of Science, the Australian Academy of Technological Sciences and the Engineering and the Academy of Sciences Malaysia signing the M.O.U.



Ahli Majlis ASM sedang berbincang dengan wakil Majlis Sains Jepun
ASM Council having discussion with representatives of the Japanese Science Council

MESYUARAT DENGAN JAPANESE SCIENCE COUNCIL (JSC)

Satu mesyuarat telah diadakan pada 3 November 1998 di antara Ahli Majlis Akademi yang diketuai oleh Presiden, Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. dengan delegasi daripada *Japanese Science Council* yang diketuai oleh Timbalan Presiden, Prof Dr Toshinosuke Kashiwazaki. Objektif mesyuarat adalah untuk membincangkan cadangan penubuhan Science Council of Asia (SCA). Akademi mengajukan beberapa cadangan kepada JSC.

MESYUARAT INTER ACADEMY PANEL (IAP) DAN SUSTAINABILITY TRANSITION CO-ORDINATING COMMITTEE (STCC) DI TRINIDAD DAN TOBAGO

Dato' Ir Lee Yee Cheong F.A.Sc., Setiausaha Agung Akademi menghadiri mesyuarat IAP dan STCC meetings di Trinidad dan Tobago dari 27 hingga 28 September 1998.

Mesyuarat IAP and STCC 1998 diadakan di Trinidad and Tobago bersempena dengan Perayaan Ulangtahun ke 10 Caribbean

MEETING WITH THE JAPANESE SCIENCE COUNCIL (JSC)

A meeting was held on 3rd November 1998 between Council Members of the Academy led by the President, Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. and the visiting delegation from the Japanese Science Council led by the Vice President, Prof Dr Toshinosuke Kashiwazaki. The objective of the meeting was to discuss the proposed formation of the Science Council of Asia (SCA). During the meeting the Academy made a number of suggestions to JSC.

INTER ACADEMY PANEL (IAP) AND SUSTAINABILITY TRANSITION CO-ORDINATING COMMITTEE (STCC) MEETINGS IN TRINIDAD AND TOBAGO

Dato' Ir Lee Yee Cheong F.A.Sc., Secretary General of the Academy attended the IAP and STCC meetings in Trinidad and Tobago from 27th to 28th September 1998.

The 1998 IAP and STCC meetings were held in Trinidad and Tobago in conjunction with the 10th Anniversary Celebration of the Caribbean Academy of Sciences (CAS). The IAP

Academy of Sciences (CAS). Mesyuarat IAP 1998 di Trinidad-Tobago mempunyai dua komponen. Komponen pertama adalah Seminar IAP mengenai Peranan Penasihat daripada Akademi-Akademi Sains kepada Kerajaan dan komponen kedua adalah Mesyuarat IAP 1998. 18 Akademi Sains menghadiri mesyuarat ini.

Mesyuarat STCC membincangkan tentang perkara-perkara yang berkaitan dengan Year 2000 Conference yang akan diadakan di Tokyo pada 15 hingga 19 Mei 2000. Mesyuarat bersetuju untuk mencadangkan tema berikut untuk persidangan yang bakal diadakan dengan Penduduk dan Alam Sekitar sebagai isu umum : Makanan, Tenaga, Kesihatan, *"Sustainable Consumption"*, Air dan Pendidikan.

1998 Meeting in Trinidad-Tobago had two components. The first component was the IAP seminar on Advisory Role of Science Academies to the Government and the second component was the IAP 1998 Meeting. 18 Academies of Sciences attended this meeting.

The STCC meeting discussed matters related to the Year 2000 Conference which will be held in Tokyo from 15th to 19th May 2000. The meeting agreed to propose the following themes for the Conference with Population and Environment as the cross cutting issues : Food, Energy, Health, Sustainable Consumption, Water and Education.

PERSIDANGAN ASIA-PACIFIC MENGENAI *" SUSTAINABLE AGRICULTURE"*

Persidangan mengenai *"Sustainable Agriculture"* telah dianjurkan oleh China Association for Science and Technology (CAST) dan American Association for Advancement of Science (AAAS). Ia diadakan di Beijing dari 4 hingga 8 Oktober 1998. Akademi telah dijemput untuk menyertai

ASIA-PACIFIC HIGH-LEVEL CONFERENCE ON "SUSTAINABLE AGRICULTURE"

The Conference on Sustainable Agriculture was organized by the China Association for Science and Technology (CAST) and the American Association for Advancement of Science (AAAS). It was held in Beijing from 4th to 8th October 1998. The Academy was invited to

persidangan tersebut. Datuk Dr Yusof Basiron F.A.Sc. membentangkan kertas kerja *"Sustaining Agricultural Development in Malaysia : Experience in the Plantation Sector"* yang ditulis bersama dengan Datuk Dr Abdul Aziz S.A. Kadir F.A.Sc. Penyertaan ini adalah berguna bagi menunjukkan minat Malaysia untuk memaparkan bahawa sektor pertanian dan perladangan di Malaysia adalah juga sedang menuju ke arah *"sustainability"* jangka panjang.

PERSIDANGAN SAINS ASIA-PASIFIK UNESCO

Dato' Ir Lee Yee Cheong F.A.Sc., Setiausaha Agung Akademi telah dijemput untuk menghadiri Persidangan Sains Asia-Pasifik UNESCO yang bertema *"Science Issues for the 21st Century"* di Sydney, Australia dari 1 hinga 5 Disember 1998. Dato' Ir Lee Yee Cheong F.A.Sc. telah memberi ucapan *"scene-setting"* di majlis pembukaan yang bertajuk *"Alternatives Futures for Science, Engineering and Technology in the Asia-Pacific Region in the 21st Century".*

Persidangan di Sydney ini adalah persediaan bagi Persidangan Sains Dunia UNESCO yang akan diadakan di Budapest pada 26 Jun hingga 1 Julai 1999.

participate in the conference. Datuk Dr Yuosf Basiron F.A.Sc. presented the paper entitled "Sustaining Agricultural Development in Malaysia: Experience in the Plantation Sector" which was co-authored with Datuk Dr Abdul Aziz S.A. Kadir F.A.Sc. The participation was useful in representing the Malaysian interest to project the fact that our agricultural and plantation sector is also striving towards long term sustainability.

UNESCO ASIA PACIFIC SCIENCE CONFERENCE

Dato' Ir Lee Yee Cheong F.A.Sc., Secretary General of the Academy, was invited to the UNESCO Asia-Pacific Science Conference themed "Science Issues for the 21st Century' in Sydney, Australia from 1st to 5th December 1998. Dato' Ir Lee Yee Cheong F.A.Sc. gave the scene-setting address at the opening reception entitled "Alternatives Futures for Science, Engineering and Technology in the Asia-Pacific Region in the 21st Century".

The Sydney Conference was the regional preparatory conference for the UNESCO World Science Conference which will be held from 26th June to 1st July 1999 in Budapest.

KONGRES ANTARABANGSA PEMULIHARAAN TAMAN BOTANI YANG KELIMA

Dato' Dr Ikmal Hisham AlBakri F.A.Sc. telah menghadiri Kongres Antarabangsa Pemuliharaan Taman Botani yang Kelima di Kristenboch, Cape Town, South Africa dari 14 hingga 18 September 1998 dengan tujuan untuk memperolehi maklumat lanjut mengenai taman-taman botani dan juga untuk mengadakan kontak dengan organisasi dan mereka-mereka yang terlibat dengan taman botani.

FIFTH INTERNATIONAL BOTANIC GARDENS CONSERVATION CONGRESS

Dato' Dr Ikmal Hisham AlBakri F.A.Sc. attended the Fifth International Botanic Gardens Conservation Congress in Kristenboch, Cape Town, South Africa from 14th to 18th September 1998 with the purposes of getting more information about botanic gardens and also establishing contacts with people and organizations involved in botanic gardens.

TAKING MALAYSIAN SCIENCE TO THE EXTREME : MALAYSIAN RESEARCH PROGRAMME IN ANTARCTICA

Kementerian Sains, Teknologi dan Alam Sekitar (KSTAS) menubuhkan satu Jawatankuasa Petugas yang diketuai oleh Dato' Dr Salleh Mohd Nor untuk menghasilkan satu kertas cadangan mengenai program P&P di Antartika. Jawatankuasa Petugas memajukan kepada Kementerian Sains, Teknologi dan Alam Sekitar satu kertas dasar mengenai Program Penyelidikan Malaysia Antartika. Kertas tersebut mengenalpasti tiga bidang umum bagi penglibatan Malaysia di

TAKING MALAYSIAN SCIENCE TO THE EXTREME : MALAYSIAN RESEARCH PROGRAMME IN ANTARCTICA

The Ministry of Science, Technology and the Environment (MOSTE) set up a Task Torce headed by Dato' Dr Salleh Mohd Nor F.A.Sc. to come up with a proposal on Malaysian R&D programmes in Antarctica. The Task Force submitted to MOSTE a concept paper on the Malaysian Antarctica Research Programme. The paper identified three broad areas for Malaysia's involvement in Antarctica research namely : Atmospheric and Earth Science,

dalam bidang penyelidikan di Antartika iaitu : *Atmospheric and Earth Science, Ocean Science* dan *Terrestrial Science* termasuk biodiversiti.

Akademi telah menganjurkan satu bengkel selama tiga hari dari 28 hingga 30 Oktober 1998. Objektif utama bengkel tersebut adalah untuk menghalusi dan memfokus semula cadangan penyelidikan Malaysia kepada minat penyelidikan di Antartika pada masa kini. Ia juga memberi peluang kepada para saintis Malaysia dan Akademi untuk belajar dari pengalaman saintis New Zealand tatkala menjalankan penyelidikan di Antartika.

Sesi setengah hari perbincangan panel dengan tajuk *"Scientific Research in Antarctica : Challenges and Opportunities"* yang pertama telah diadakan pada pagi 28 Oktober 1998. Perbincangan Panel ini dipengerusikan oleh Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. dan dihadiri oleh 25 peserta.

Satu bengkel diadakan selepas perbincangan panel. Lebih kurang sepuluh saintis yang telah memajukan kertas cadangan mereka untuk menjalankan penyelidikan di Antartika menghadiri bengkel tersebut.

Ocean Science and Terrestrial Science including biodiversity.

The Academy organized a three day workshop from 28th to 30th October 1998. The primary objective of the workshop was to refine and refocus the Malaysian research proposal to the current research interest in Antarctica. It also provided the opportunity for the Malaysian scientists and the Academy to learn from the experiences of the New Zealand scientists when undertaking research in Antarctica.

A half-day panel discussion on "Scientific Research in Antarctica : Challenges and Opportunities" was first held on the morning of 28th October 1998. The Panel Discussion was chaired by Tan Sri Datuk Dr Omar Abdul Rahman F.A.Sc. and attended by about 25 participants.

The workshop followed the panel discussion. About ten scientists who had submitted their proposals to undertake research in Antarctica attended the workshop. After a lengthy deliberation and discussion, five proposals which met the standard of current research in Antarctica were accepted for

Selepas perbincangan yang menyeluruh, lima cadangan yang memenuhi standard penyelidikan terkini di Antartika diterima untuk dimajukan kepada *Intensification of Research in Priority Areas (IRPA)* dan *Antarctica Research Advisory Council (ARAC).*

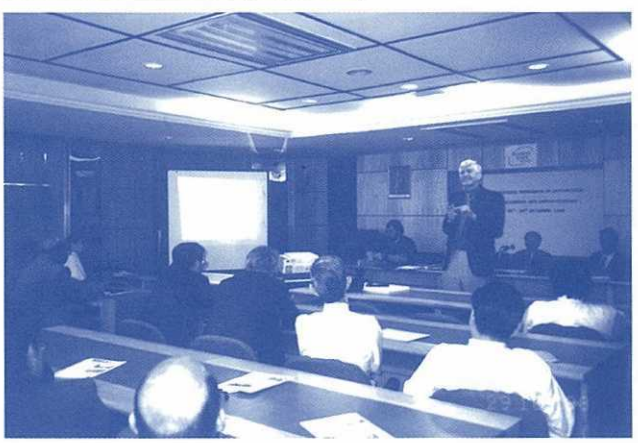
Berlanjutan daripada bengkel ini, Akademi telah memajukan laporan kepada KSTAS yang mengandungi cadangan-cadangan mengenai program penyelidikan Malaysia di Antartika.

submission to the Intensification of Research in Priority Areas (IRPA) Panel and the Antarctica Research Advisory Council (ARAC).

Following this workshop, the Academy submitted a report to MOSTE containing the recommendations on the Malaysian Research programme in Antarctica.



Sesi bengkel mengenai Program Penyelidikan Malaysia di Antartika
Workshop on Malaysian Research Program in Antarctica



Lawatan
Visits

Sepanjang tahun 1998, Akademi telah menerima kunjungan daripada Ketua Setiausaha Negara dan telah membuat kunjungan hormat ke atas Ketua Setiausaha Kementerian Sains, Teknologi dan Alam Sekitar yang baru. Akademi juga telah melawat Kementerian Sains, Teknologi dan Alam Sekitar (KSTAS), Vietnam dan National Center for Natural Sciences and Technology (NCST) Vietnam dan juga ke beberapa institusi P&P di Malaysia. Lawatan dan pelawat adalah seperti berikut:

During the year 1998, the Academy hosted the visit of the Chief Secretary to the Government and paid a courtsey call on the new Secretary General of MOSTE. The Academy also visited the Ministry of Science, Technology and the Environment (MOSTE), Vietnam and the National Center for Natural Sciences and Technology (NCST) Vietnam and to various R&D institutes in Malaysia. The list of visits and visitors were as follows:

Tarikh/*Date*	Lawatan/*Visits*
13th April 1998	Kunjungan Hormat ke atas Ketua Setiausaha Kementerian Sains, Teknologi dan Alam Sekitar (KSTAS) yang baru, Encik Cheah Kong Wai *Courtesy Call on the new Secretary General of Ministry of Science, Technology and the Environment (MOSTE), Mr Cheah Kong Wai*
21st – 23rd June 1998	Lawatan ke Kementerian Sains, Teknologi dan Alam Sekitar (KSTAS), Vietnam dan National Center for Natural Sciences and Technology (NCST) Vietnam *Visit to Ministry of Science, Technology and the Environment (MOSTE), Vietnam and National Center for Natural Sciences and Technology (NCST) Vietnam*
30th June 1998	Lawatan Ke Multimedia Development Corporations (MDC) *Visit to Multimedia Development Corporations (MDC)*
1st August 1998	Lawatan Ke Institut Penyelidikan Minyak Kelapa Sawit Malaysia (PORIM) *Visit to Palm Oil Research Institute of Malaysia (PORIM)*
22nd August 1998	Lawatan Ke Institut Mikroelektronik Malaysia (MIMOS) *Visit to Malaysian Institute for Microelectronics (MIMOS)*
11th – 22nd October 1998	Lawatan Ke Antartika *Visit to the Antarctica*
17th – 25th November 1998	Lawatan Ke Australian Academy of Science (AAS) dan Australian Academy of Technological Science and Engineering (ATSE) *Visit to the Australian Academy of Science (AAS) and Australian Academy of Technological Science and Engineering (ATSE)*

Pelawat Akademi
Academy Visitors

Tarikh/*Date*	Pelawat/Visitors
3rd March 1998	Lawatan oleh Prof Juhani Ahava, Pengerusi Finnish Academy of Technology *Visit by Prof Juhani Ahava, Chairman of Finnish Academy of Technology*
6th May 1998	Lawatan Encik K.J. Bhardwaj Kaunselor, Indian High Commission, Kuala Lumpur *Visit by Mr K.J. Bhardwaj, Councellor, Indian High Commission, Kuala Lumpur*
29th June 1998	Lawatan oleh Tan Sri Abdul Halim Ali, Ketua Setiausaha Negara *Visit By Tan Sri Abdul Halim Ali, Chief Secretary to the Government*
15th July 1998	Lawatan Prof Emeritus Sir Gustav Nossal, Bekas Presiden Australian Academy of Science *Visit of Prof Emeritus Sir Gustav Nossal, Past President, Australian Academy of Science*
17th July 1998	Lawatan Prof Madya Dr Bing Lim of Harvard Medical School *Visit of Assoc Prof Dr Bing Lim of Harvard Medical School*
14th September 1998	Lawatan oleh Prof Atta-Ur-Rahman, Coordinator General OIC Standing Committee in Scientific and Technological Co-operation (COMSTECH) *Visit of Prof Atta-Ur-Rahman, Coordinator General OIC Standing Committee in Scientific and Technological Co-operation (COMSTECH)*
29th October - 2nd November & 18th - 22nd November 1998	Lawatan delegasi dari National Centre for Natural Science and Technology (NCST), Vietnam *Visit of delegations from National Centre for Natural Science and Technology (NCST), Vietnam*
14th - 20th December 1998	Lawatan oleh H.E. Academician Prof Janybek Jaenbayev, President, National Academy of Sciences of the Kyrgyz Republic *Visit by H.E. Academician Prof Janybek Jaenbayev, President, National Academy of Sciences of the Kyrgyz Republic*

Penerbitan ASM
ASM Publications

Senarai penerbitan Akademi bagi tahun 1998 adalah seperti berikut:

The list of the 1998 publications of the Academy were as follows

No.	Penerbitan/*Publications*
1.	Laporan Tahunan/Penyata Kewangan 1997 *1997 Annual Report/Statement of Accounts*
2.	The Water Crisis : A Compelling Case for Integrated Water Resources Management in Malaysia
3.	Malaysia's Natural Resources Management : An Integrated Approach
4.	Deklarasi oleh "APEC Science, Engineering and Technology Roundtable Meeting on the APEC Agenda for S&T Industry Cooperation into the 21st Century" *Declaration by "APEC Science, Engineering and Technology Roundtable Meeting on the APEC Agenda for S&T Industry Cooperation into the 21st Century"*
5.	"Cancer and Immortality" by Prof Dr Looi Lai Meng F.A.Sc.
6.	Prosiding Seminar "ASEAN S&T Vision : Towards Technologically Competent ASEAN" *Proceedings of Seminar "ASEAN S&T Vision : Towards Technologically Competent ASEAN"*
7.	Prosiding Persidangan "APEC Science, Engineering and Technology Roundtable Meeting on The APEC Agenda for Science and Technology Industry Cooperation into the 21st Century" *Proceedings of "APEC Science, Engineering and Technology Roundtable Meeting on The APEC Agenda for Science and Technology Industry Cooperation into the 21st Century"*
8.	Newsletter Akademi *Academy Newsletters*

CADANGAN MENGENAI TAMAN BOTANI NASIONAL

Akademi telah menyerahkan satu cadangan kepada Kementerian Sains, Teknologi dan Alam Sekitar untuk menubuhkan Taman Botani Nasional di Sungai Buloh. Akademi telah mencadangkan satu Yayasan Taman Botani Nasional ditubuhkan sebagai salah satu cara terbaik untuk membangun dan menguruskan Taman Botani tersebut.

Yayasan yang dicadangkan akan berfungsi sebagai sebuah badan bebas dengan perlantikkan Lembaga Pemegang Amanah oleh Menteri Sains, Teknologi dan Alam Sekitar dan ianya akan dianggotai oleh beberapa orang ternama termasuk Fellow Akademi. Pihak Akademi juga bersetuju untuk membantu Kementerian dalam tugas awalan penubuhan Yayasan dan pembangunan Taman Botani Nasional ini.

PROPOSAL ON THE ESTABLISHMENT OF THE NATIONAL BOTANIC GARDEN

The Academy has submitted a proposal to the Ministry of Science, Technology and the Environment for the establishment of a National Botanic Garden at Sungai Buloh. The Academy proposed the setting up of a National Botanic Garden Foundation as a viable option to develop and manage the botanic garden.

The proposed Foundation shall function as an independent body with a Board of Trustees appointed by the Minister of Science, Technology and Environment and shall include prominent individuals and Fellows of the Academy. The Academy also agreed to assist the Ministry in the initial work of establishing the Foundation and the development of the National Botanic Garden.

Projek Khas
Special Project

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Penyata Kewangan

Statement of Accounts

SIJIL KETUA AUDIT NEGARA MENGENAI AKAUN AKADEMI SAINS MALAYSIA BAGI TAHUN BERAKHIR 31 DISEMBER 1998

SIJIL KETUA AUDIT NEGARA MENGENAI
AKAUN AKADEMI SAINS MALAYSIA
BAGI TAHUN BERAKHIR 31 DISEMBER 1998

Akaun yang dinyatakan di muka surat 3 hingga 9 telah diperiksa oleh Tetuan Ernst & Young, Akauntan Awam, di bawah arahan saya mengikut Akta Audit 1957 dan berpandukan standard pengauditan yang diterima umum.

2. Pada pendapat saya :

(a) akaun tersebut menunjukkan satu kenyataan yang benar dan saksama mengenai kedudukan kewangan Akademi Sains Malaysia pada 31 Disember 1998 dan hasil kendalian berkaitan dengannya serta perubahan kedudukan kewangan bagi tahun berakhir pada tarikh itu; dan

(b) rekod-rekod perakaunan serta daftar-daftar berkaitan telah diselenggara dengan memuaskan.

(JOHANNA BINTI NGADIMUN)
b.p. KETUA AUDIT NEGARA

KUALA LUMPUR
12 April 1999.

AKADEMI SAINS MALAYSIA

PENYATA PRESIDEN DAN BENDAHARI KEHORMAT
AKADEMI SAINS MALAYSIA

Kami, **ACADEMICIAN TAN SRI DATUK DR OMAR BIN ABDUL RAHMAN F.A Sc** dan **TAN SRI DATO' IR. SHAHRIZAILA BIN ABDULLAH F.A Sc.**, yang merupakan Presiden dan Bendahari Kehormat AKADEMI SAINS MALAYSIA dan juga Ahli-ahli Majlis, dengan ini menyatakan bahawa, pada pendapat Majlis Akademi, penyata kewangan yang dikemukakan dalam halaman 3 hingga 8 beserta dengan nota-nota di dalamnya adalah disediakan untuk merujuk pandangan yang benar dan saksama berkenaan : -

(a) lembaran imbangan pada 31 Disember 1998 dan akaun pendapatan dan perbelanjaan untuk tahun berakhir tarikh itu; dan

(b) penyata aliran tunai untuk tahun berakhir pada 31 Disember 1998

Bagi pihak Majlis

Tan Sri Datuk Dr Omar bin
Abdul Rahman F.A Sc
Presiden
Akademi Sains Malaysia

Bagi pihak Majlis

Tan Sri Dato' Ir. Shahrizaila
bin Abdullah F.A Sc
Bendahari Kehormat
Akademi Sains Malaysia

KUALA LUMPUR, MALAYSIA

Tarikh : 31 MAR 1999

AKADEMI SAINS MALAYSIA

PENGAKUAN OLEH PENGARAH EKSEKUTIF KE ATAS PENGURUSAN KEWANGAN AKADEMI SAINS MALAYSIA

Saya, **DR SAMSUDIN BIN TUGIMAN**, pegawai utama yang bertanggungjawab ke-atas pengurusan kewangan **AKADEMI SAINS MALAYSIA**, dengan ikhlasnya mengakui bahawa penyata kewangan yang dikemukakan dalam halaman 3 hingga 9 beserta dengan nota-nota di dalamnya, mengikut sebaik-baik pengetahuan dan kepercayaan saya, adalah betul dan saya, membuat ikrar ini dengan sebenarnya mempercayai bahawa ianya itu adalah benar dan atas kehendak-kehendak Akta Akuan Berkanun 1960.

Sebenarnya dan sesungguhnya
diakui oleh penama di atas
di Kuala Lumpur, Malaysia

.....

pada 25 MAR 1999

Di hadapan saya,

PESURUHJAYA SUMPAH
W 092
ROBERT LIM HOCK KEE
MALAYSIA

Lot 2.10, Tingkat 2, Bangunan Angkasa Raya
Jalan Ampang, 50450 Kuala Lumpur

AKADEMI SAINS MALAYSIA

AKAUN PENDAPATAN DAN PERBELANJAAN
BAGI TAHUN BERAKHIR 31 DISEMBER 1998

	1998 RM	1997 RM
PENDAPATAN		
Pelbagai penerimaan	17,847	2,304
Faedah dari deposit jangka pendek	989,958	876,198
Kutipan Majlis Makan Malam	46,679	25,424
Geran	845,000	157,401
	1,899,484	1,061,327
PERBELANJAAN		
Emolumen	411,539	337,347
Perkhidmatan dengan bekalan	349,564	513,954
Penyelenggaraan dan alat kelengkapan pejabat	11,931	14,023
Pemberian dan kenaan bayaran tetap	4,842	4,657
Perbelanjaan-perbelanjaan lain	9,645	18,276
Susut nilai harta tetap	148,012	144,219
Majlis makan malam	45,488	42,458
Perbelanjaan mengendalikan program sains	467,681	294,292
	1,448,702	1,369,226
KELEBIHAN/(KEKURANGAN) PENDAPATAN	450,782	(307,899)

AKADEMI SAINS MALAYSIA

LEMBARAN IMBANGAN PADA 31 DISEMBER 1998

	Nota	1998 RM	1997 RM
ASET TETAP	2	1,393,489	1,539,851
ASET SEMASA			
Lain-lain siberhutang	3	164,049	127,648
Deposit jangka pendek	4	11,206,942	5,090,625
Tunai dan baki di bank	5	225,347	5,975,706
		11,596,338	11,193,978
LIABILITI SEMASA			
Lain-lain sipiutang		126,645	321,430
		126,645	321,430
ASET SEMASA BERSIH		11,469,693	10,872,549
		12,863,182	12,412,400
DIBIAYAI OLEH:			
KUMPULAN WANG:			
Baki pada 1 Januari		12,412,400	12,720,299
LEBIHAN/(KEKURANGAN) PENDAPATAN ATAS PERBELANJAAN		450,782	(307,899)
Baki pada 31 Disember		12,863,182	12,412,400

Nota-nota dihalaman 6 hingga 9 merupakan sebahagian daripada akaun ini.

AKADEMI SAINS MALAYSIA

PENYATA ALIRAN TUNAI BAGI
TAHUN BERAKHIR 31 DISEMBER 1998

	Nota	1998 RM	1997 RM
ALIRAN TUNAI DARI AKTIVITI OPERASI			
Lebihan/(kekurangan) pendapatan atas perbelanjaan		450,782	(307,899)
Pelarasan:			
Susutnilai		148,012	144,219
Faedah dari deposit jangka pendek		(989,958)	(878,502)
Kerugian operasi sebelum perubahan modal kerja		(391,164)	(1,042,182)
Penghutang		(36,401)	341,781
Pemiutang		(194,785)	87,434
Tunai bersih daripada aktiviti operasi		(622,350)	(612,967)
ALIRAN TUNAI DARI AKTIVITI PELABURAN			
Pembelian aset tetap		(1,650)	(29,029)
Faedah diterima		989,958	878,502
Tunai bersih daripada aktiviti pelaburan		988,308	849,473
PERTAMBAHAN/(PENGURANGAN) BERSIH TUNAI DAN KESETARAAN TUNAI		365,958	236,506
TUNAI DAN KESETARAAN TUNAI PADA 1 JANUARI		11,066,331	10,829,825
TUNAI DAN KESETARAAN TUNAI PADA 31 DISEMBER	6	11,432,289	11,066,331

Nota-nota dihalaman 6 hingga 9 merupakan sebahagian daripada akaun ini.

AKADEMI SAINS MALAYSIA

NOTA-NOTA KEPADA AKAUN-31 DISEMBER 1998

1. DASAR -DASAR PERAKAUNAN

(a) Asas Perakaunan

Akaun telah disediakan mengikut konvension kos sejarah dan mengikut piawaian perakaunan yang diluluskan.

(b) Aset tetap dan susutnilai

Aset tetap dinyatakan pada kos setelah ditolak susutnilai terkumpul.

Susutnilai bagi aset tetap dikira berasaskan kaedah garis lurus di atas kos di sepanjang tempoh hayat kegunaan aset-aset tersebut pada kadar tahunan yang berikut:-

Perkakas pejabat	20%
Komputer	20%
Kenderaan bermotor	20%
Pengubahsuaian	2%

2. ASET TETAP

	Perkakas pejabat RM	Komputer RM	Kenderaan bermotor RM	Pengubah-suaian RM	Jumlah 1998 RM	Jumlah 1997 RM
KOS						
Pada 1 Januari	80,748	242,632	304,604	1,108,398	1,736,382	1,707,353
Tambahan	1,650	-	-	-	1,650	29,029
Pada 31 Disember	82,398	242,632	304,604	1,108,398	1,738,032	1,736,382
SUSUTNILAI TERKUMPUL						
Pada 1 Januari	19,110	49,128	100,583	27,710	196,531	52,312
Dikenakan	16,397	48,526	60,921	22,168	148,012	144,219
Pada 31 Disember	35,507	97,654	161,504	49,878	344,543	196,531
NILAI BUKU BERSIH						
31.12.1998	46,891	144,978	143,100	1,058,520	1,393,489	-
31.12.1997	61,638	193,504	204,021	1,080,688	-	1,539,851

3. LAIN-LAIN SIBERHUTANG

Lain-lain siberhutang merupakan terutamanya pendapatan faedah terakru daripada deposit jangka pendek.

4. DEPOSIT JANGKA PENDEK

	1998 RM	1997 RM
Deposit disimpan dalam institusi kewangan berlesen	11,206,942	5,090,625

Faedah tetap untuk deposit yang disimpan dalam institusi kewangan berlesen adalah di antara 5.70% - 11.30% (1997 : 7.25% - 8.55%).

5. TUNAI DAN BAKI DI BANK

Termasuk dalam tunai dan baki di bank adalah baki:-

	1998 RM	1997 RM
Dana "Science Awareness Programme" - Petrosains	446,281	-
Geran Ranjit Baghwan Singh	16,540	25,545
Dana "Science Excellence Programme"	-	13,848

6. TUNAI DAN KESETARAAN TUNAI

Tunai dan kesetaraan tunai diwakili oleh item-item yang berikut:-

	1998 RM	1997 RM
Deposit jangka pendek	11,206,942	5,090,625
Tunai dan baki di bank	225,347	5,975,706
	11,432,289	11,066,331

7. ANGKA-ANGKA PERBANDINGAN

Angka-angka perbandingan yang tertentu telah dikelaskan semula untuk disesuaikan dengan perbentangan akaun tahun semasa.