



News from ICTP

No. 26/27
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Editorial Note

Twenty-five years – a quarter of a century! An appropriate span of time for an institution to look back at its genesis and at its achievements. Abdus Salam, the initiator of the International Centre for Theoretical Physics, must be congratulated for what he has created from nothingness and brought to such a level of efficiency and recognition.

In these twenty-five years, more than 40,000 scientists have come to the ICTP with 22,000 of them from developing countries, 5,000 research papers

have been published and 400 high level courses have been held in its premises not to speak of the hundreds of activities sponsored in the developing countries themselves.

The world community of scientists is grateful to Abdus Salam and to all those who have made it possible to create the ICTP and to make it grow – in particular to Paolo Budinich who convinced the Italian Government to host it in Trieste.

The speeches which are published in this issue express this gratitude and should stimulate all of us who work towards the same goal for even



The host, Professor Abdus Salam, in the opening address. The guest of honour, Prime Minister Giulio Andreotti, is sitting at his right.

**PROGRAMME OF THE 25TH ANNIVERSARY CONFERENCE ON:
"FRONTIERS IN PHYSICS, HIGH TECHNOLOGY AND MATHEMATICS"**

31 October - 3 November 1989

Tuesday, 31st October

- 9:30 - - **Abdus Salam, ICTP - Opening, Chairman: Antonino Zichichi, ICTP Scientific Council**
- **Samuel C.C. Ting, CERN, Switzerland**
- **Hans Blix, IAEA, Austria**
- **Presentation of a "1989 Distinguished Service Award" to an ICTP Staff Member**
- **Klaus H. Standke, UNESCO, France**
- **Sigvard A. Eklund, IAEA, Austria**
- **Paolo Budinich, ICTP**
- **Stig Lundqvist, ICTP**
- **Danlele Amati, International School for Advanced Studies, Italy**
- **ICTP Staff Representative**
- **Renato A. Ricci, Società Italiana di Fisica, Italy, and European Physical Society, Switzerland**
- **Giulio Andreotti, Presidente del Consiglio, Italy**
- **Claudio Villi, Consorzio per l'Incremento degli Studi e delle
Ricerche degli Istituti di Fisica dell'Università di Trieste - Opening for the New Building**

Meeting the Press (Seminar Room - first floor)

- 12:00 - **Carl J. Conti, IBM Somers, U.S.A.**
"Supercomputing - Powerful Tool for Scientific Discovery and Industrial Competitiveness"
15:30 - **Farouk El-Baz, Boston University, U.S.A. : "The Earth as Viewed from Space", Chairman: Alfred K. Mann**
16:30 - **Abdus Salam, ICTP: "A Life of Physics", Chairman: Edoardo Amaldi**
18:00 - **Giorgio Parisi, Università di Roma "Tor Vergata": "Spin Glass Theory", Chairman: Daniele Amati**

Wednesday, 1st November

- 8:45 - **Presentation of commemorative medallions to Representatives
from Institutions and ICTP Staff Members**
10:15 - **Pierre G. de Gennes, Collège de France - Paris: "Adhesion and Fracture", Chairman: James A. Krumhansl**
11:45 - **Enrico Giusti, Università degli Studi di Firenze, Italy: "Topics in the Calculus of Variations", Chairman: James Eells**
15:00 - **Albert J. Libchaber, The James Franck Institute, U.S.A: "From Chaos to Turbulence in Thermal Convection",
Chairman: David P. Ruelle**
16:30 - **Manfredo do Carmo, Instituto de Matematica Pura e Aplicada, Brazil**
"Minimal Surfaces and Surfaces of Constant Mean Curvature", Chairman: Enrico Giusti

19:00 - **RECEPTION (Adriatico Guesthouse)**
20:30 - **CONCERT (Adriatico Guesthouse)**

Thursday, 2nd November

- 9:00 - **John S. Bell, CERN, Switzerland: "First Class and Second Class Difficulties in Quantum Mechanics",
Chairman: Alain Aspect**
10:00 - **Roman Jackiw, Massachusetts Institute of Technology, U.S.A: "Quantum Phases and Angles",
Chairman: Walter Thirring**
11:30 - **Horst Störmer, AT&T Bell Laboratories, U.S.A.: "Fractional Quantum Numbers in Condensed Matter Physics",
Chairman: Boris L. Altshuler**
15:00 - **Steven Weinberg, The University of Texas at Austin, U.S.A.,
"Tracing the Mechanism of Electroweak Symmetry Breaking", Chairman: Abdus Salam**
16:00 - **Martin J. Rees, University of Cambridge, U.K.**
"The Emergence of Structure in the Universe and the Dark Matter Problem", Chairman: Dennis W. Sciama
17:30 - **Ludvig D. Faddeev, Steklov Leningrad Otdel Matematiskii Institut, U.S.S.R.**
"The Relation Between Physics and Mathematics", Chairman: John S. Bell

Friday, 3rd November

- 9:30 - **Praveen Chaudhari, IBM Yorktown Heights, U.S.A.: "Science in High Technology", Chairman: Manuel Cardona**
11:00 - **Federico Capasso, AT&T Bell Laboratories, U.S.A.: "Band Structure Engineering of Novel Semiconductors:
from Quantum Mechanics to the Electronics and Photonics of the 21st Century", Chairman: Andrea Frova**
15:00 - **Alfred K. Mann, University of Pennsylvania, U.S.A.: "Neutrinos: Unique Probe of Stellar Interiors"
Chairman: Martin J. Rees**
16:00 - **Hans Frauenfelder, University of Illinois at Urbana-Champaign, U.S.A.:
"Proteins-Paradigms of Complex Systems", Chairman: Elias Burstein**
17:30 - **J. Robert Schrieffer, ITP Santa Barbara, U.S.A.: "What is Really Going on in High T_c Superconductors?"
Chairman: Karl A. Müller**

stronger commitments.

The 25th Anniversary Conference

The First Session

31 October

Celebrating twenty-five years of activity deserves a special ceremony. Stig Lundqvist and Hilda Cerdeira, chairpersons of the Organizing Committee of the Conference, and their collaborators reserved the first three hours of the meeting for the distinguished guests who had been invited to share with Abdus Salam and the scientific community the joy of the celebrations.

The Prime Minister of Italy, Mr. Giulio Andreotti, the guest of honour, arrived at 10:00 a.m., accompanied by A. Zichichi, member of the ICTP Scientific Council, who chaired the ceremony. He was welcomed by Abdus Salam, H. Blix, Director General of the International Atomic Energy Agency, K.

Standke representing the Director General of UNESCO, S. Lundqvist, Chairman of the Scientific Council, S. Eklund, Director General Emeritus of the IAEA. The highest authorities of the Region, Province and Municipality of Trieste as well as distinguished members of the Italian Government were there together with hundreds of enthusiastic scientists.

In addition to the speeches presented further in this issue, there were shorter addresses by Daniele Amati, Director of the International School for Advanced Studies, Renato Ricci from the European Physical Society, Stig Lundqvist, and A. Lucatello, ICTP Staff Representative. Samuel Ting, Nobel Laureate for Physics 1976, also presented a series of transparencies illustrating Eloisatron, a project headed by A. Zichichi.

Of particular significance to the ICTP was the handing over of the symbolic keys of the new building by Claudio Villi, Chairman of the Consortium for the Advancement of Studies and Research of the Physics Institutes of Trieste University, to Abdus Salam.

The ceremony ended at 1:00 p.m. and the floor was left to the first scientific lecture by C.J. Conti from IBM.

Opening Speech by Abdus Salam

*Director
International Centre
for Theoretical Physics
and
President
Third World Academy of Sciences*

President Andreotti, Directors General, Authorities, Colleagues, Ladies and Gentlemen,

It is a very happy occasion when we meet today to celebrate the Anniversary of the International Centre for Theoretical Physics. To find the idea which one expressed twenty-nine years ago in 1960 alive and well is a very pleasant experience and first and foremost, I must render my gratitude to Allah.

Twenty-five years have elapsed since this Centre was formally inaugurated in the Conference Room of the Trieste Jolly Hotel on 5 October 1964. We have come a long way since. From less than 200 scientific visitors in 1964-65, we now welcome more than 4,000 a year. The Centre's annual budget was US\$ 350,000 - it reaches US\$ 19 million this year, principally from the Government of Italy. This comprises US\$ 5.5 million spent on activities held outside Trieste, including those of the US\$ 5.5 million spent on activities held outside Trieste, including those of the Third World Academy of Sciences. From its inception till today the Miramare complex has received and spent a total of US\$ 112 million, all for Physics. From a small provisional building in Piazza Oberdan down town, our activities now take place in four different buildings to which a fifth will be added soon. In twenty-five years, 40,000 scientists, of whom 22,000 from the developing countries have passed through Trieste.

We naturally take pride, Mr. President, in quoting these figures. However, we feel even more gratified



The Chairman of the opening session was Prof. A. Zichichi (Member of the ICTP Scientific Council and President of the World Lab) from CERN.



Professor Abdus Salam opens the 25th Anniversary Ceremony.

when we think of the kind of revolution the very existence of this Centre has brought about in the developing countries.

We believe that science is an essential element for the development of the poor nations. So is technology. *"Technology is a gift of God. After the gift of life it is perhaps the greatest of God's gifts. ... The most revolutionary aspect of" (science and) "technology is its mobility. Anybody can learn it. It jumps easily over barriers of race and language. It took three generations of language. It took three generations of misery for the older industrial countries to master the technology of coal and iron. The new industrial countries of East Asia, South Korea and Singapore, mastered new technology and made the jump from poverty to wealth in a single generation. ... Unlike our political leaders" - I should rather say most of our political leaders - "we have first-hand knowledge of a business which is not merely multinational but in its nature international. ... As scientists we work every day in an international community. ... That is why we are appalled by the narrow-mindedness and*

ignorance of our political leaders. ..." (Freeman Dyson, *Infinite in All Directions*, Chapter 16) - and, Mr. President, I would indeed make a few exceptions.

We believe that real technology transfer needs to be accompanied by a genuine science transfer. The role of this Centre is to make such science transfer possible and, at the same time, make it possible for men and women of talent from the developing countries to work most of the time in their home countries while giving them the opportunity to remain competitive on the international scientific scene through regular visits to the Centre. It also offers young researchers opportunities for learning the latest in their subject, and helps to build up the scientific community in the developing countries through the organisation of scientific meetings of high standing in their own milieu and through the setting up of collaborative networks; all this with due regard to the needs of the countries or of the regions in areas as diverse as condensed matter physics, remote sensing, radiopropagation, energy,

biophysics and the list could continue.

For this role, the ICTP has created several modalities. It is a multidisciplinary institution where research and training-for-research are intimately related. Our research groups in fundamental physics, condensed matter physics and mathematics publish more than 400 scientific papers each year. Altogether since 1964, 5060 papers, 80% of which were produced by scientists from developing countries, have been published in international scientific journals. For high-level training, the Centre has organised, since 1964, 400 courses, workshops, seminars and conferences with an average audience of 80-90 participants. The Centre also helps experimentalists through its training programme in Italian laboratories. In the developing countries themselves, our Office of External Activities has supported 407 training programmes, workshops and conferences since 1986. These two programmes, among others, are financed by the Direzione Generale per la Cooperazione allo Sviluppo of the Italian Foreign Ministry.

In our high-level training programmes, in the last 10 years, more and more emphasis has been laid upon practice and experimental work. **Therefore, the computing facilities of the Centre have been substantially upgraded and three laboratories have been set up in microprocessors, high T_c superconductivity and in laser physics for in-house research as well as in support of the courses.**

As I said earlier, the Centre wishes to build up scientific communities in the Third World. To this end, it has set up, in addition to the other modalities, a network of 413 Associates and of 388 institutions in the developing countries which provides opportunities for periodic scientific visits to the Centre.

Mr. President, but what is most on my mind just now is the prosperity of this Centre, besides the three new centres which together will constitute the International Centre for Science. As you

remember, on 5 February 1988, I came to see you and told you that I would like very much to spend the last 10 years of my life trying to build up new Centres on Chemistry, Pure and Applied, on Earth Sciences and the Environment and on High Technology and New Materials. As usual, you were gracious enough to listen carefully to what I was saying. As a result, Consigliere Giorgio Rosso Cicogna was appointed as the Project Leader for the three new centres, with the Italian Government, through the UNIDO organisation - here represented by its Director General, Mr. Domingo L. Siazon - acting as the primary source of funding to the amount of US\$ 2.5 million in the initial phase. A feasibility report was prepared with the major emphasis on the Italian participation, both for help with the problems of High Technology as well as assuring the quality of all initiatives connected with the Centres. We are now ready to start the pilot activities of the three new centres, from tomorrow - in fact we have already been underway for a few weeks!

Mr. President, the needs and expectations of the Third World are so vast that we cannot confine our actions and challenges to our initiatives in Trieste.

I have talked to the World Bank about the possibility of creating 20 new centres around the world which would be linked to the Trieste Centre. The World Bank has shown concrete interest. We have the support of the Non-Aligned Movement who, in their Conference held in Belgrade last September, concluded that *"there is a need to support the establishment in the developing countries of a world class Network of Research and Training Institutes dedicated to the development and application of High Technology and appeals to the international community, particularly the developed countries, and the multilateral financial and developmental institutions, especially the World Bank, to support this Network within the framework of international*

cooperation; and that there is a need to stimulate development of indigenous infrastructures".

The Third World Academy of Sciences is in the process of constituting a Committee of Heads of State of Third World countries. Mr. Michael Manley of Jamaica and the Secretary General of the United Nations support this initiative. I met Mr. Perez de Cuellar last week and he promised to help us mobilize to this endeavour the United Nations system, donor governments, foundations and other organisations. Finally, on Thursday, 26 October, on the occasion of the celebration of the United Nations Decade for Science and Technology for Development, I had the privilege of addressing the General Assembly of the United Nations on the matter of these three new centres plus the 20 new centres. According to the ambitious design which is emerging, the three new centres here in Trieste would be the responsibility of the Italian Government, while the 20 centres outside of Trieste would become the responsibility of the World Bank, of other donor nations and - what is most important - of the countries and regions concerned.

Mr. President, just what you did five years ago when you set up the Third World Academy of Sciences with a charge of \$1.5 million, we are now expecting from your visit here today something similar in respect of the three new centres and their charge of \$10 million each.

I now have the pleasant but difficult task of expressing my gratitude to all those who have helped us to make all this possible. I am unable to list them all and I hope that those who are not explicitly mentioned here will forgive me - they are in my heart and must rest assured that I shall never forget them. I wish to express my gratitude to the international organisations - the IAEA and UNESCO (and particularly, IAEA) which set up the Centre in the first place and which jointly share the responsibility for it - and to UNIDO

which promoted ICGEB according to our model and is now helping us with the three new centres. My particular thanks go to you personally, Mr. President, and to the Government of Italy; to the Authorities of the Region Friuli-Venezia-Giulia and of the Province and Municipality of Trieste, to the University of Trieste, to the various organisations which have supported and are still supporting our action, to the American Physical Society and the European Physical Society, to the community of scientists from all over the world and, in particular, the Italian community and to my scientific collaborators in Trieste and last, but not least, to the staff of the Centre who have worked to give the physicists the support which was needed.

However, allow me to pay a special tribute to a few friends who have been close to me in the early life of the ICTP: to Sigvard Eklund, Director General Emeritus of the IAEA, to my colleague Paolo Budinich, father-figure of the Centre who was my Deputy Director until 1978, to the late Prince Raimondo della Torre e Tasso who so generously offered his kind collaboration as soon as Trieste became a candidate for hosting the Centre, to Dr. Hans Blix, the present Director General of IAEA - who has twice given me the opportunity of fulfilling the dream I had for the Third World when I had perforce to leave my own country 36 years ago - and to Dr. Federico Mayor, the present Director General of UNESCO as well as to his two predecessors.

Before giving the floor to Professor Antonino Zichichi, the great Italian physicist, member of the Centre's Scientific Council and father of the World Laboratory idea which is complementary to the ICTP and to the three new centres, I also wish to thank Stig Lundqvist, Chairman of the Centre's Scientific Council, and his collaborators for organising the programme of this 25th Anniversary and the lecturers - some of the greatest physicists of the world - and participants

who have travelled from so far away and all of you, Ladies and Gentlemen, who share our joy and celebrate with us our twenty-five years of hard work.

I now give the floor to the Chairman of this session, Professor Antonino Zichichi.

Thank you.

Address by Hans Blix

*Director General
International Atomic Energy Agency*

Mr. President, Authorities, Ladies and Gentlemen,

It is a great privilege for me to thank President Andreotti for having graciously agreed to come to Trieste for the celebration of the twenty-fifth anniversary of the establishment of the International Centre for Theoretical Physics. Your presence here among us bears testimony to the untiring interest and support which the Government of Italy has always shown towards the Centre.

I should perhaps recall that when the

site of the Centre was being selected, of all the offers received from Member States desiring to host it, the offer from the Government of Italy was by far the most generous. The interest of the Government of Italy for the development of the Centre has never flagged since. The level of activities undertaken by the Centre nowadays would never have been possible were it not for the major contribution of the Government of Italy.

When it was founded in October 1964, four years after its creation had been proposed by Abdus Salam, the Centre was part of the International Atomic Energy Agency only, which meant that the range of scientific disciplines it could deal with was limited to, for example, high-energy, nuclear and plasma physics and condensed matter physics. All the disciplines had to bear some relation to the Agency's statutory obligations. The rapid success of the Centre and the benefits which it brought to generations of young scientists from developing countries soon made an expansion into other branches of science desirable. With UNESCO joining the Agency in operating the Centre in 1971, such an expansion became possible.

The Centre was then able, in principle, to respond to demand for activities in other fields, such as mathematics, physics of the earth, the atmosphere, and the living state, non-conventional energy, etc.

In twenty-five years, the Centre has designed a broad spectrum of working methods which make it a truly unique institution in the world. It does research in fundamental, condensed matter and plasma physics and in mathematics; it organizes high-level courses, workshops and other meetings (40 to 45 each year) in a variety of subjects, including practical and computer training when necessary; it organizes the training of experimentalists in advanced laboratories and helps developing countries to build up their scientific communities. What is more, it runs training laboratories: one for microprocessor technology, and one for superconductivity. In recent years, the Centre has published more than 400 preprints each year. In twenty-five years, over 5,000 such preprints have been produced.

An institution like the Centre can appeal to scientists from all over the world, from developing as well as advanced countries, only if it has strong scientific leadership and if it produces. In the early days, the scientific excellence of the Centre was acknowledged by outstanding scientists such as the late J.R. Oppenheimer. It was confirmed in 1979 by the Nobel Prize which the Director of the Centre, Abdus Salam, shared with S. Glashow and S. Weinberg. The Agency is probably the only UN organization which can count a Nobel Prize Laureate among its staff.

To survive, a Centre must be efficient. Despite the complexity of its operation, the Centre performs exceptionally well. More than 70% of its annual budget is spent on the implementation of scientific programmes, a proportion which has not changed over the years.

Why has the Centre been so successful? There can be no doubt that



Dr. Hans Blix, Director General of the International Atomic Energy Agency (Vienna, Austria). On the right, Prof. Paolo Budinich, co-founder and first Deputy Director of the Centre.

the competence and prestige of its Director and the contributions of the Government of Italy have been essential to this success, but I believe that the fact that the Centre belongs to both the Agency and UNESCO is no less important. Being a part of these two organizations means true internationality and gives equal rights to nationals of all Member States without discrimination on grounds of race or creed. The International Centre for Theoretical Physics is a place where every scientist, whichever country he may come from, feels at home and on an equal footing with his colleagues.

The success of the Centre has been such that it has become a model for other initiatives in this city of Trieste. Our sister organization, UNIDO, set up an International Centre for Genetic Engineering and Biotechnology three years ago. In 1985, Abdus Salam founded the Third World Academy of Sciences, an institution with programmes complementing those of the Centre. Moreover, upon his proposal in his capacity of President of the Academy, the Government of Italy has agreed to finance a feasibility study on pilot projects for an International Centre for Sciences to be located in Trieste, comprising a Centre for High Technology and New Materials, a Centre on Earth and the Environment and a Centre on Pure and Applied Chemistry.

We very much hope that this new complex will become a reality in the near future. This will firmly establish Trieste as the "City of Science", as it is already often referred to.

Today, a new 3,000 square meter building will be handed over to the Centre. I wish to thank the Region Friuli Venezia Giulia and the Fondo Investimento Occupazionale - FIO - which have financed this very important work, doubling the capacity of our Centre. Our thanks are also due to the Consorzio per l'Incremento degli Studi e Ricerche of the Institute of Physics of the University of Trieste - usually referred to as the "Consorzio", which has

taken upon itself responsibility for channelling the funds and dealing with the many difficulties which unavoidably accompany such a construction project.

I wish now to pay tribute to the man who has made all this a reality. Abdus, I congratulate you on all you have achieved, particularly on your passionate struggle in support of the developing countries. No-one has understood better than you that the most important factor for improving the standard of living of billions of people who live in underdeveloped countries is knowledge, science. And no-one could have been more consistent and imaginative in working to improve knowledge and science in developing countries. We at the IAEA share your ideals and wish you every success in your future ventures.

Address by Klaus H. Standke

*Director
Unit of Development
and Coordination
of Operational Activities
UNESCO*

Your Excellency Mr. Andreotti, Prime Minister of Italy,
Professor Lundqvist, Chairman of the ICTP Scientific Council,
Dr. Blix, Director General of the IAEA,
Professor Abdus Salam, Director of ICTP,
Distinguished guests and participants
ICTP,

Distinguished guests and participants,
The Director General of Unesco, Dr. Federico Mayor, would have liked to be here today to join in the celebration of the 25th anniversary of the International Centre for Theoretical Physics (ICTP) and express in person his deep admiration for the Centre's accomplishments. Unfortunately, his schedule in connection with the General Conference prevents him from doing so and he has asked me instead to convey to you his congratulations for the first quarter of century of existence of the ICTP and his best wishes for the

Centre's future.

Special anniversaries like this one are an occasion to pause and contemplate both past achievements and future developments, to see how far we have come and where we are going. Above all let us remember that it is people who create and develop institutions, give them purpose and fill them with life. This is therefore a good opportunity to pay a special tribute to the efforts and dedication of the Centre's staff - the scientists, administrators, secretaries, librarians and various general service staff without whom the ICTP would not be what it is today.

The creation of ICTP in 1964 under the auspices of the International Atomic Energy Agency came at the end of a period during which several other major instances of international scientific co-operation came to fruition: the European Laboratory for Particle Physics, better known by its acronym CERN (Centre Européen pour la Recherche Nucléaire), was established in 1954 under the auspices of UNESCO; and, in 1962, UNESCO helped establish the Latin American Centre of Physics (CLAF), an intergovernmental organization comprising 13 Latin American member states. Even the creation of UNESCO (in 1946), or more precisely the fact that there is an 'S' in UNESCO's name, and the establishment of the IAEA (in 1957) themselves can be considered as part of this same period of world-wide effort in developing new forms of international scientific cooperation.

The support of the international scientific community was of course crucial to the success of these efforts. Equally important was the active role of leading scientists such as Isidor Rabi, Edoardo Amaldi, Niels Bohr and Abdus Salam in discussions that involved both scientists and government authorities. This dialogue enabled scientists and diplomats from different countries to learn to work together and to explore together forms of cooperation where both scientists and governments stood to gain. In the case of both CERN and



Dr. Klaus H. Standke deputized for the Director General of UNESCO.

ICTP, the results were truly impressive: both institutions have developed into major scientific enterprises which attract thousands of visiting scientists each year and contribute importantly to advancing our understanding of the fundamental nature of matter. CERN and ICTP could not have achieved this success without a major funding commitment by governments. The Government of Italy contributes generously to both of these institutions. Indeed in the case of ICTP, Italy alone carries almost the entire financial burden.

financial burden.

Physics is the study of the world, natural and man-made, at its profoundest level. But physics is also about problem solving. To understand the physical world at its deepest level requires the mastery of mechanical, electronic, optical, mathematical, computing, and many other challenging skills, as well as the ability to think analytically, creatively and inventively. The mastery of all these techniques and theories makes the physicist a singularly versatile scientist.

This is generally well appreciated in industrialized countries but much less so

in many countries of the Third World. It is not always easy to explain to government authorities in developing countries that without a capacity for research in the basic sciences and mathematics no country can hope to apply the results of science to development or adapt technology to fit its own needs and aspirations. UNESCO is the only organization of the United Nations system with a broad mandate for the promotion of basic sciences. As such, the Organization has a very important role to play in a very important role to play in convincing developing countries to make a sustained effort to provide increased local support to university-level research and teaching of physics, chemistry, biology and mathematics. UNESCO's success in achieving this depends to a large degree on the Organization's own commitment to basic research and science teaching. This was one of the main reasons why UNESCO decided in 1970 to join the IAEA in operating the International Centre for Theoretical Physics. For ICTP is truly a very special institution. It is a major international centre devoted to the needs

of physicists and mathematicians from developing countries.

There are few physicists in this world today who are not familiar with the acronym ICTP and the name of the city of Trieste. Since its creation 25 years ago, the Centre has known an extraordinary development and success, thanks in large part to the vision, determination, energy and scientific eminence of its founding fathers, Professor Abdus Salam, its Director, and Professor Paolo Budinich, the then Deputy Director. They were joined at the very start by another scientist, Dr. André Hamende, who has ever since been responsible for a multitude of tasks concerned with the organization and management of the Centre. It is a particular pleasure for me to pay tribute to these three scientists who have contributed so much to the development of science in the Third World.

What can we at UNESCO wish ICTP for its future? Mainly, that it will continue in the path set by its founding fathers and retain its scientific quality, its creativity in finding new solutions to new needs, and its concern and dedication for the development of physics in the Third World. This will require renewed efforts to assure the continuity of funds required for the Centre's operation and programmes but also a strong commitment to the Centre's international mission.

Remarks by Sigvard Eklund

*Director General Emeritus
International Atomic Energy Agency*

Already during 1962 – my first year as Director General of the IAEA, I learnt about a proposal made by a former collaborator and friend of mine, Abdus Salam, to establish within the framework of an international organisation an institute where young scientists from developing countries could study theoretical physics under the guidance of outstanding specialists.

Such an institute should represent a centre of excellence and be devoted not only to education but also to advanced research.

I had met Professor Salam when he served as scientific secretary in 1958 during the organisation of the second United Nations International Conference on the Peaceful Uses of Atomic Energy, which was under preparation in the United Nations Headquarters in New York. I had myself been appointed Secretary General of the Conference, which was scheduled to take place in Geneva in the autumn of 1958. It should be added that Salam had already served in 1955 in the same capacity for the first conference on the same topic.

The extraordinary qualities of professor Salam's scientific contributions were already then recognized. He was, for example, the youngest member ever admitted to the Royal Society.

He was to receive many more signs of appreciation from the scientific world, topped with the Nobel Prize in 1979 for his work, together with Sheldon Glashow and Steven Weinberg for *"their contribution to the theory of the unified weak and electromagnetic interaction between elementary particles, including inter alia the prediction of the weak neutral current"*.

It is not my intention to outline the history of the ICTP, the 25th Anniversary of which we are celebrating today. Let me, however, mention that already in 1962 at the first General Conference I attended as head of the IAEA, it was reported that the Agency, that is Salam, had in 1962 arranged one high energy physics course in Italy and another on low energy physics in Czechoslovakia, an indication of a new activity of the Agency.

The General Conference agreed in principle, without financial commitments for the future, to the establishment of a centre, the brainchild of Salam; an event he recalls as the *"most momentous day of my life"*. Fortunately he did not on that occasion

realise all the frustrations he would have to overcome in his future dealings with, not the least, different international organizations. The IAEA's Board of Governors was still doubtful about the future financing of the Centre.

A couple of years later the annual General Conference was informed that the provisional premises in Trieste had been put at the disposal of a Centre for Theoretical Physics by the Italian authorities, including the promise of future financial assistance. The Conference also learnt that a Scientific Council of the Centre had met under the chairmanship of Professor Manuel Sandoval Vallarta of Mexico, with the participation of UNESCO, CERN and Dubna as invitees.

Vallarta served with distinction for many years as Chairman.

At a meeting of the Scientific Council Professor L. Van Hove most generously paid the following tribute to the Centre, I quote

"When one sets up an institute, one expects a period of gradual start where people gather, where people begin to select their problems, and where gradually, the time of original contribution to the field develops. We have here seen this whole process in not only very accelerated but very successful form. Within a span of time of less than an academic year, the Centre at Trieste has succeeded in gathering a considerable number of people ... and produced extremely original contributions and established the scientific reputation of the Centre all over the world in all the established places beyond any shadow of doubt".

Professor Victor F. Weisskopf said in the same spirit in a letter to a colleague that *"the most decisive achievements of theoretical physics during 1964-65 took place at Trieste"*.

It is appropriate to mention in this context that, from the very beginning of the operational activities of the Centre,



From left to right: Prof. P. Budinich, Prof. S. Lundqvist and Dr. Sigvard Eklund (standing). Dr. Sigvard Eklund from Sweden, Director General of the International Atomic Energy Agency when the Centre was founded, is now Director General Emeritus of the IAEA.

the Director could use and enjoy the full support of three outstanding men. One was an Italian theoretical physicist, Paolo Budinich, Professor at the University of Trieste and with extensive relations with administrative authorities in and outside the region. Budinich became the Deputy Director. The other man was Dr. André Hamende from Belgium, who with enduring loyalty and untiring efforts put the Centre's policy into practice. The third one was Dr. John A. Strathdee, an outstanding theoretical physicist from the USA who dealt with the scientific aspects of the Centre's research work.

From provisional quarters in use since 1964 in the city of Trieste, the Centre moved in 1968 to a new building in the vicinity of the Miramare Park.

At the Inauguration Ceremony and the following review of contemporary physics, eight Nobel Laureates were present. The Italian generosity in providing buildings for the Centre and financial contributions is a convincing support of Salam's belief in miracles, provided that one goes out and helps them find their way.

Among outstanding scientists who made lasting contributions to the ICTP, I would like to mention, besides Vallarta - Alfred Kastler from France, Nobel Prize winner, for many years Chairman of the Scientific Council. Robert Oppenheimer from the USA who, when participating in the Scientific Council, shared his vast experience in administration of large scale science. Further advice (and the list includes only a few) was given by personalities like V. Weisskopf, A. Bohr, Stig Lundqvist, Malu wa Kalenga, V. Latorre, A. Matveyev, V.G. Soloviev, J. Strathdee, John Ziman and H. Yukawa. Important contributions were made in two reviews of the achievements of the Centre, one made in 1969 by Hendrik B.G. Casimir from Holland and the other one in 1974 by Van Hove from Belgium. Also should be mentioned all those who generously gave their time to lecture at the Centre.

Through the years, meetings of the Scientific Council when the chores of more formal items had been solved always, during the informal discussions, gave me a stimulating feeling of having had the opportunity of getting a vision of future developments in the deciphering of the secrets of nature.

In the early discussions concerning the establishment of a centre in Trieste for theoretical physics, professor I.I. Rabi of the Columbia University took a rather cautious position, only to become an enthusiastic supporter of Salam's ideas later on. Today, when we will witness the inauguration of another wing of the Centre, and when we will also learn about plans to add further facilities to those already existing here, an episode comes to my mind as recalled by Hans Bethe.

Rabi had in 1944 received the Nobel Prize and Dwight D. Eisenhower, when he was President of Columbia University, had asked Rabi to come and talk with him and started his conversation by saying, "Professor Rabi, I congratulate you on the Nobel Prize, and besides, I am always very happy to see one of the employees of the University". Bethe says in his recollection that Rabi drew himself up to his full height of five feet five inches and said, "Mr. President, the faculty are not the employees of the University. They are the University!"

I end my remarks today with this episode because for more than 25 years I have had the opportunity to follow the ICTP, this fine institution has become what it is now, because Professor Salam has been working completely unselfishly and with an unbelievable enthusiasm for the Centre. Just as the faculty in Columbia are the Columbia University, Salam is the International Centre for Theoretical Physics.

Congratulations for all that you have achieved. Best wishes for the future.

Address by Paolo Budinich

Deputy Director of ICTP
from 1964 to 1978

After 25 years it is wonderful to be able to say: it was a desperate enterprise, almost a utopia - that of creating in Trieste a centre of research of high culture under the flag of the United Nations. A centre which would help the newborn University of Trieste to become big not in number but in quality, to become a University able to expand the universal values of culture also beyond the, at that time, narrow-minded and threatening frontiers. Just as Diego De Castro, Italian representative to the Allied Military Government recommended in his reports to Rome.

The enterprise was desperate but we can now say that we made it, or almost. As the ancients said: "*defeat is orphan but victory has many fathers*". We truly had many fathers in our case and it is right to remember some of them here now, especially those who have unfortunately left us.

Above all, the Mayor of Trieste Franzil, who with his enthusiasm mobilized the Comune and the Province with its President Delise. The President of the Cassa di Risparmio Sadar who immediately set apart the, at that time, extraordinary sum of 100 million Italian lire in favour of the initiative. Prince Raimondo della Torre e Tasso who Raimondo della Torre e Tasso who generously offered land and hospitality in his historical castle of Duino. Our friend Luzzatto-Fegiz who convinced his colleague Fanfani to commit the Government for the candidature of Trieste. And then in Rome the Ministry of Public Education with our friend Avveduto, the Ministry of Foreign Affairs with Ambassador Ortona, who after three years of long and diplomatic battles saw the candidature of Trieste prevail upon many more prestigious ones like Copenhagen and Vienna.

After 25 years it is also right to draw up a balance; above all, of successes.



Prof. Paolo Budinich, former Deputy Director of the ICTP and former Director of the International School for Advanced Studies (ISAS-SISSA), the man who persuaded the Italian authorities to host the ICTP in Trieste.

One of the nicest is that of having brought to our country Abdus Salam, now Honorary Citizen of Trieste; for me this personally has meant having found a great friend. I wish to recall with gratitude that my first contacts with Salam occurred through our friends Amaldi and Villi.

Of great and significant value are the numerous signs of gratitude both for us and our country on behalf of the many, more than 20.000 friends and colleagues from developing countries whom the Centre has helped to scientifically survive while remaining in their countries and thus beginning their first steps towards scientific, social and economic emancipation.

It is also a comfort to know that the Centre has given origin to the Third World Academy of Sciences, an instrument of enormous and not yet completely realized potentials.

Furthermore, it is a comfort to know how the Centre has determined also the birth of other important institutions in Trieste like the Research Area, the Trieste International Foundation for Scientific Progress and Freedom of which Salam is President, the

International Centre for Genetic Engineering and Biotechnology, the Synchrotron Light Radiation Laboratory, the International School for Advanced Studies, with the help of the Ministry of Education especially with the help of Fazio and D'Addona. These institutions, together with the Centre, have contributed to attract here in Trieste various among the best representatives of scientific research, not only Italian but also foreign. Therefore, the University of Trieste, also through the scientific institutions which surround it, is really on its way to becoming a great university as it should have and as it was wished.

But, as in all human enterprises, not everything went well, or has not yet been developed since, after all, we are only in the middle of the work.

The first idea of a physics centre under the auspices of the United Nations came from Bohr, Einstein and Oppenheimer and it was expected to be both a theoretical and experimental physics centre. After this idea, brought by Salam to the International Atomic Energy Agency of Vienna, the Centre in Trieste was realized for the benefit of

Third World countries, that necessity foreseen by Bohr of extending the activities of the Centre with experimental laboratories became urgent, and was repeatedly requested by Third World countries, and justly carried out by Salam.

This necessity gave birth to the project of the International Centre for Science (ICS) which, if realized, will greatly extend the effectiveness of the work which in the name of Italy is done in Trieste in favour of the Third World, and which will bring new, more explicit acknowledgements to the work carried out and major credit to our country.

Among the programmes not yet realized but absolutely to be realized, I wish to recall that of the Third World Academy of Sciences to provide each of almost 100 Third World countries of at least a complete and up-to-date library. This sole initiative if realized would give to our city a role of high civilization such to be able to link together in the history of tomorrow the name of Trieste to that of ancient Alexandria.

Through the Centre and the institutions that have been generated from it, we have attracted to Trieste representatives of high prestige in scientific research, both Italian and foreign. I will limit myself to citing besides the name of Abdus Salam from London, Yu Lu from Peking, Eells from Warwick, called by the ICTP, and Sciama from Oxford, Amati from Geneva, Ellis from Cape Town, called by SISSA. This power of attraction of Trieste towards the maximum representatives of worldwide sciences is of inestimable value not only for Trieste but also for Italy and I hope that this prerogative of Trieste to attract the best of world-wide science, and for which the presence of Salam in Trieste is essential, be particularly followed also in the future.

A last regret is that of not having provided enough to spread especially here in Trieste, the image of what the Centre is and does for Trieste, for Italy, for the world. As has been said many times,

the Centre is better known in New York and in the world than in Trieste. And I am sorry not to have recorded during the years the many phone calls I have received from the United Nations, from Ambassadors representatives of Italy abroad, who more or less said: "I constantly receive enthusiastic congratulations on behalf of representatives of the Third World for what Italy does for them in Trieste; please tell me what you do so as to allow me to reply in an adequate manner".

Certainly the Centre is also more known in Rome than in Trieste, the presence of Minister Andreotti here today is a tangible sign. I am pleased to recall that Minister Andreotti came to the Centre for the first time in 1981 and was brought here by our friend Giorgio Tombesi. I remember very well how Minister Andreotti immediately understood the great potentiality that the Centre could have not only for Trieste but above all for our country in its civil activity in favour of developing countries.

Subsequently Minister Andreotti came to Trieste accompanied by Nino Zichichi who helped us in an effective manner to transform the political intentions in legislative actions. We have promised a statue to Nino, maybe with lightness forgetting that rarely a statue is given to a living person. Therefore, I hope to be able to maintain the promise we made to Nino, but at the latest time possible!

Trieste maybe has not yet understood the nature and potentials of the Centre. I know very well how both Salam and I are considered by many with regret. For example it is with regret that Salam, Honorary Citizen, participates rarely to the life of the city. This could be true but those Triestini who regret this do not know that Salam, like very few, has been bringing very high the name of Trieste in the world, not so much on the streets but in the governments, in academies, in universities, in Assemblies of the United Nations and

their Agencies.

To obviate this gap of which we are well aware and also responsible, especially myself, we have created the "Immaginario Scientifico", in the framework of the exhibition "Trouver Trieste" which the Comune of Trieste organized in Paris in 1986.

The success of the "Immaginario" in Paris, and afterwards in Milan, in Naples and in Moscow and also elsewhere has encouraged to represent it in Trieste, with the help of the Municipality, the Region and the Ministry of Education, and to transform it into the "Laboratorio dell'Immaginario Scientifico" which is the prologue of a Museum of Science of third generation where the people of Trieste in the framework of the programme promoted by the Ministry of University and Research will be able to finally understand and participate in this enterprise Trieste City of Science which is just at the beginning and which will develop towards a possible way of being.

But just as the Centre also the Laboratorio dell'Immaginario Scientifico will be able to carry out in the country a service which goes beyond the frontiers of the city in the field of diffusion of scientific culture. In fact the Laboratorio dell'Immaginario Scientifico has been invited to represent Italy in a new European association between the big museums of science denominated ECSITE which will officially be founded in Paris next December and will have the support of the EEC.

support of the EEC.

I would like to finish off my speech with a wish. When Abdus Salam came to Trieste he promised to learn at least one word of Italian per year. Well I can assure you that he has kept his word. I wish Trieste and him personally that for the 50th anniversary of the Centre he will still be here and pronounce his speech in Italian.

Address by Giulio Andreotti

*Prime Minister
Government of Italy*

I always consider it a great privilege to participate in meetings of this high level and to be back once again here to this Centre. Professor Salam, on opening our meeting, said he thanks God for what has been accomplished over these 25 years. I join him, but I also thank wholeheartedly Professor Salam himself for what has been done and is still being done here. I opened at random the book which Professor Salam has given me and my sight fell on a sentence which says "Our proposals are not utopian, ... if the political will is there to implement them". This is true at a both national and international level. At the national level, and sometimes among the enormous difficulties the administrators are faced with (the figures of our public debt are more proper of astronomy rather than of state budget), we find sometimes also psychological difficulties. I will not recount the whole story, but I must tell you that when I, as a minister, had to tackle problems together with men of science – and here I will limit to men of physical sciences – I realized that the first difficulty is the comprehension of problems by those who should not strive to comprehend.

When the Centre was being created here, I was in charge of Defence. There here, I was in charge of Defence. There was the problem of the small reactor of the Military Navy, the Camen, and there was another problem which I found stimulating, that is putting two ministries together (which is an extremely difficult task), the Ministry of Defence and that of Industry, in order to draw up a program on nuclear propulsion. The lamentations on the various difficulties and on the cost of oil were just starting. To do research seemed a logical thing, nuclear propulsion was no longer something absolutely new, the Savannah had already been built, but international



The Prime Minister of Italy, Giulio Andreotti, a great friend of ICTP.

malevolence argued that nuclear propulsion was not making headway because of opposing interests in the oil milieu. At that time we drew up the programme, with many difficulties in obtaining uranium – there were terrible barriers and other difficulties... But things on earth are strange. After the Ministry of Defence, I happened to go to the Ministry of Industry and I thought I would finally be able to solve this problem from the other side. No way! I found myself in a horrible situation. Those were the years when a mysterious ignorance tried to boycott what was being done in the nuclear field in Italy. Ignorance tried to boycott what was being done in the nuclear field in Italy. On handing over to me, my predecessor said to me: "Look, as you are the Minister, you are also chairman of the committee on nuclear energy. I have never set my foot in that room. Don't you do either". I thought this was not a laudable method, so I chaired that committee every Friday, with understandable anxiety; the diffuse ignorance had negatively influenced the staff and sometimes on Friday morning we – the Committee – were welcomed by the staff out in the street throwing coins at us, demonstrating for no

scientific reason but in fact to express their worry. I must say that I recall that period with deep sadness because I think that if, for example, the studies on fast reactors and the other programs of the Italian Committee on Nuclear Energy had not been slowed down, maybe we could have faced the next period in a different way, with less fatigue and fewer doubts.

When I became Foreign Minister, Prof. Zichichi and Prof. Budinich introduced to me Professor Salam who told me about the programmes of this Centre. On that occasion I told myself I should not let difficulties overcome me. On that occasion I told myself I should not let difficulties overcome me any more. Now I am happy to see this Centre and all that has derived from it – I am not going to illustrate all this; a temptation the politician should always flee from is that of talking of what does not belong to his own science; I would repeat what has been said very well by you all who can talk about such things without reading other people's notes.

I believe we may all be very happy. I have already mentioned the connection existing at international level – it also exists in the extended scientific field. It is true, sometimes scientists are blamed

for inventing instruments of destruction, but it has been said quite justly that it is the wrong application of science by politicians, not science itself, which creates difficulties. We have seen, for instance, the enormous contribution given by scientists over the last few years for solving what seemed to be an impossible problem – the negotiations for disarmament. There were serious doubts on controllability; if there is no controllability, negotiations for disarmament cannot reach positive conclusions. The scientists, also thanks to an initiative taken by the Italian government itself (an international seminar for the control of nuclear disarmament first, and then for controlling the bans on chemical weapons) have shown that all this is possible. The checks which seemed to be absolutely inconceivable now take place so easily that the first check carried out by an Eastern county in Italy, according to the agreements of 8 December 1987, was so smooth that I was not even aware of it. I learnt about it when I went to Bulgaria, a few months after the Bulgarians had done their checks in keeping with that agreement. Scientists even before politicians have taught us that what had appeared an unattainable target was in fact so easy to reach that it is now normal routine.

But – and then I finish – what seems important here is the significance of this Centre, namely the concept of science really within everybody's reach, a Centre, namely the concept of science really within everybody's reach, a concept of co-operation to development which is not limited to aid or to the construction of public structures. In fact, such co-operation firstly entails the training of managerial levels, and then research centres must be established. And when we see your work, the work which is being done at the World Lab (and I am grateful to Prof. Ting for what he has illustrated to us), I mean the real co-operation given to the developing world, then we feel deeply happy. You are right, Professor Budinich, these things are not done loudly, maybe they

are not even known by those who are near. Indeed, Sicily is talked about not so much because of Erice but because of many other things. We are not glad of this, we would like to hear a bit more about Erice and the results obtained there. But when things stem from a good seed, the crop may sometimes be slightly spoiled, it may be slower than expected, but after all it is always to be had. In any case, those who work are aware of making serious efforts for providing global peace with its only sound basis - better conditions for justice. It is for this reason that I renew to you, Professor Salam, to all your collaborators, and to all those who put the positive weight of their own expertise and dedication into the other scientific institutions which have been gradually established here in Trieste, my senses of deep gratitude. I believe that, in a city which has patriotism as its own ideal emblem, this is a way of being really faithful to the best values of our homeland.

Address by Claudio Villi

*President
Consortium for the Advancement
of Studies and Research
of the Physics Institutes
of Trieste University*

I take the floor on behalf of the Consortium for the Advancement of Studies and Research of the Physics Institutes of Trieste University. The Consortium, which I have the honour to preside, was instituted when the International Centre for Theoretical Physics was founded. For this reason, also the Consortium is celebrating its 25th anniversary today.

The Consortium was devised with an aim to consolidate the International Centre for Theoretical Physics (which was headed towards international scopes) in the cultural, economic and social reality of Region Friuli Venezia Giulia, to provide the Centre's development with all support from local authorities



Prof. Claudio Villi, former course director of ICTP activities and now President of the Consortium for the Advancement of Studies and Research of the Physics Institutes of Trieste University, was there for handing over the keys of the New Building to Professor Abdus Salam. Prof. Claudio Villi is also Scientific Chairman of the World Lab Branch in Trieste.

(Municipality, Province and Region) and institutions, as well as to keep contacts with national institutions.

The scope of the Consortium has expanded gradually together with the operational needs of the Centre's programmes. One can say that the Consortium and the Centre have been living, for 25 years, in a sort of symbiosis as regards programmes and operation - there are few such examples both in Italy and abroad. The merit for all this goes to the City of Trieste and all the local institutions. In the rapid and dramatic growth of the Centre, the Consortium has played the role of a hypophysis which regulates the Centre's anatomy and physiology. Hoping that Cartesius does not take offence at this, I wish to say that over these 25 years, the Consortium has played a role similar to that of a "pituitary gland", that is the meeting point of that particular "*res cogitans*" which is science with its problems, and of that particular "*rex extensa*" which are the laboratories, the buildings and the land on which these are located. Indeed, it was the Consortium which co-ordinated the construction of the first building of the Centre, its doubling, the guest house and the

Galileo Galilei building, as well as the construction of the new buildings now under way. The activity of the Consortium over these 25 years has been recorded in a report which has been distributed to all participants in this ceremony. But the most convincing evidence is provided by all the structures existing in the Miramare area, which anybody can see with one's own eyes.

I, a citizen of Trieste who long ago was professor and researcher at the Physics Institute of Trieste University, feel obliged to express my deepest gratitude to my friends Budinich and Salam for enrolling the scientists from Trieste in the great international scientific competition.

I am glad to hand over to Professor Abdus Salam the keys of the new buildings made available to the Centre by the Consortium.

On behalf of the Consortium, I offer Prime Minister Giulio Andreotti an emblematic bronze figure by the Triestino sculptor Marcello Mascherini representing the goddess Minerva. On doing this, I am well aware of and grateful for the political support which Giulio Andreotti has systematically



The New Building, adjoining the existing Main Building and equal to it in size. It will be occupied in early 1990.

given to the development of scientific research in our country over many years.

Distinguished Service Award

For the first time since its creation, one of the Distinguished Service Awards of the International Atomic Energy Agency went to a Staff Member of the ICTP. Ms. Maria Zingarelli, head of the Library, is the 1989 recipient. She has been with us since the creation of the Centre and is undoubtedly one of the people who have made the ICTP Library one of the best in Europe. The medal and the USS 1,000 cheque were handed to her by Dr. Hans Blix, Director General of the IAEA, during the 25th anniversary ceremony on 31 October. The choice of Maria as the recipient is a particularly happy one. She certainly deserves it and we congratulate her most cordially.

On Wednesday 1 November, Prof. M. Zifferero, Deputy Director General for Research and Isotopes, gave the "20

Years of Loyal Service" certificate to Dr. John Alexander Strathdee and to Ms. Ondina Turra. Both of them are well known to ICTP scientists. John has been the closest scientific collaborator of Abdus Salam since 1964 and Ondina is the head of the office dealing with the



Ms. Maria Zingarelli receives the Distinguished Service Award from the hands of the Director General of the International Atomic Energy Agency.

Associate Members, the Federation Agreements and the Fellowships for Research at Italian Laboratories.

We congratulate them for these years of hard work.

25th Anniversary Conference

A Short Report

by H. Cerdeira

*Chairperson
Organizing Committee*

In 1964, Professor Abdus Salam created the International Centre for Theoretical Physics with the idea of developing sciences in Third World countries. Twenty five years later, we believe there were good reasons to celebrate the enterprise, and an Anniversary Conference took place from 31 October to 3 November here in Trieste.

Initially the science chosen was Physics, later Mathematics was also added. During several years only theory in three basic branches existed: high



Prof. Stig Lundqvist, Chairman of the Scientific Council of the ICTP and of the Committee for the 25th Anniversary Conference. He is also responsible for the ICTP Condensed Matter Research and for the Adriatico Conferences.



The Main Lecture Hall of the ICTP on 31 October 1989.

energy, condensed matter and astrophysics. The development of high technology and the advancement this aspect has in the quality of life in each country made aware the direction of the Centre that, if the ICTP was to keep helping advancing the developing countries, it could not forget that aspect. With that in mind two laboratories were created: Microprocessors and Superconductivity, and are now expanding more onto high technology with the creation of new centers.

The title of the Anniversary Conference reveals the past and future aims of the Centre: "Frontiers in Physics, High Technology and Mathematics". A flight over some of the most important achievements in the sciences in the last twenty-five years with a look at the future.

The program was selected by an Organizing Committee: L. Bertocchi, H. Cerdeira (chairperson), H.R. Dalafi, A.M. Hamende, S. Lundqvist (chairperson) and E. Vidiz, together with

Professor Salam. The topics covered some of the very fundamental aspects such as: classes of quantum measurements, topological phases, electroweak interactions, differential geometry, passing through interesting

and basic such as the fractional quantum Hall effect, remote sensing, complexity, chaos, high T_c superconductivity, to finish with very applied aspects as quantum devices and proteins, the basis of future technological development.

With the idea of a proper festive celebration in physics, the chairmen were chosen to match the speakers, to ensure an interesting discussion. This we believe to have achieved; some of the discussions extended for a very long time. Since that was as important as the talks themselves, we thank the chairmen by listing them below, together with the speakers:

by listing them below, together with the speakers:

- Boris L. Al'tshuler (USSR); Edoardo Amaldi (Italy); Daniele Amati (SISSA); Alain Aspect (France); John S. Bell (CERN/UK); Elias Burstein (USA); Federico Capasso (Italy/USA); Manuel Cardona (USA/FRG); Praveen Chaudhari (USA); Carl J. Conti (USA); Pierre G. de Gennes (France); Manfredo do Carmo (Brazil); James Eells (UK); Farouk El-Baz (USA); Ludvig D. Faddeev (USSR); Hans Frauenfelder (USA); Andrea Frova (Italy); Enrico Giusti (Italy); Roman Jackiw (USA); James A. Krumhansl (USA); Albert J. Libchaber (France/



Prof. S. Weinberg giving his lecture at the 25th Anniversary Conference. He shared the Nobel Prize with Abdus Salam and Sheldon Glashow in 1979.

USA); Alfred K. Mann (USA); Karl A. Müller (Switzerland); Giorgio Parisi (Italy); Martin J. Rees (UK); David P. Ruelle (France); Abdus Salam (ICTP/Pakistan); J. Robert Schrieffer (USA); Dennis W. Sciama (SISSA/UK); Horst Störmer (FRG/USA); Walter Thirring (Austria); Steven Weinberg (USA); Antonino Zichichi (Italy/CERN).

The actual programme is shown in the table on Page 2.

In summary, the Conference brought together a substantial number of scientists from all over the world to a kind of meeting very much appreciated today when most of them are on very narrow fields. It has been, although with a look at the future, a nostalgic conference where the idea was to get together and discuss science without the rush of today's life.



The 22nd Meeting of the ICTP Scientific Council was held in the new Meeting Room of the ICTP Main Building, only recently finished.

22nd Meeting of the ICTP Scientific Council

The ICTP Scientific Council held its annual meeting on 30 October, the day before the 25th anniversary celebrations. During this important meeting, chaired by Prof. S. Lundqvist, not only were the programmes reviewed and assessed but also proposals were made to cope with the growth of the ICTP, which at times creates cash flow difficulties. The Council unanimously congratulated Abdus Salam for his twenty-five years of hard work and for the spectacular changes in the developing countries due to the ICTP's action. The Members of this year's meeting were:

Chairman: Professor Stig Lundqvist (Chalmers University of Technology, Göteborg, Sweden); Secretary: Professor Paolo Budinich (International School for Advanced Studies - SISSA, Trieste, Italy); Members: Professor Abdus Salam (International Centre for Theoretical Physics, Trieste, Italy), Dr. Farouk El Baz (Center for Remote Sensing, Boston, USA), Professor José J. Giambiagi (Centro Latinoamericano de

Física, Rio de Janeiro, Brazil), Professor Leon M. Lederman (unable to attend, Fermi National Accelerator Laboratory, Batavia, USA), Professeur Malu wa Kalenga (Commissariat Général à l'Energie Atomique, Kinshasa, Zaïre), Professor Norman H. March (unable to attend, Clarendon Laboratory, Oxford, England), Professor Yash Pal (Department of Science and Technology, Government of India, New Delhi, India), Professor Jacob Palis (Instituto de Matemática Pura e Aplicada, Rio de Janeiro, Brazil), Professor Roald Z. Janeiro, Brazil), Professor Roald Z. Sagdeev (Institute of Space Research, Moscow, USSR), Professor Yousef Sobouti (University of Shiraz, Iran), Professor Zhou Guangzhao (unable to attend, Division of Mathematics and Physics, Beijing, P.R. China) and Professor Antonino Zichichi (unable to attend, CERN, Geneva, Switzerland).

A UNESCO Chair for History of Science at the ICTP

UNESCO's Director General Federico

Mayor Zaragoza decided last year to launch a new initiative for the promotion of international intellectual co-operation: the UNESCO Chairs. The ICTP, one of the first institutions to which a UNESCO Chair has been assigned, is honoured to welcome Jagdish Mehra (USA) as the first holder of this prestigious Chair.

Jagdish Mehra is the author of the monumental *"The Physicist's Conception of Nature in the 20th Century"* (Dordrecht, Reidel, 1973) – a critical in-depth review of lectures delivered in 1977 at the ICTP on the 70th birthday of P.A.M. Dirac. He joined the ICTP at the beginning of October. He is an old friend of the Centre. His plan is to deliver three cycles of lectures: the historical development of physics in the 20th century, the lives and scientific work of some of the great pioneers who have fashioned the world view of physics in the 20th century and a history of man's changing vision of the universe from Pythagoras to Stephen Hawking.

Jagdish Mehra gave his inaugural lecture entitled "The Dream of Leonardo



Professor Abdus Salam and Prof. Jagdish Mehra at the first lecture of the series "UNESCO Programmes on the History of Science".

da Vinci" on 17 October 1989 in the presence of Professor Abdus Salam, Director of the ICTP. He was introduced by Dr. Hollister, representing the Director General of UNESCO.

New Computer

At the end of 1988, the ICTP decided to restructure its Computer Centre with a view, among other things, to implement a network of workstations intended to be the standard working environment for most of the users. To this end, the old Gould computer (the main machine) was replaced in September 1989 with a Convex C210 supercomputer, with 128 MB of RAM, 2 GB of disks, running the UNIX operating system. This is a very fast machine (50 MFLOPS peak).

The new acquisition has also been motivated by the future activities of the International Centre for Science which will make extensive use of computer facilities for research in geophysics, chemistry, electronic design and materials science.

The ICTP is also starting two new projects to provide computational support to our visitors directly in their home institutions.

The new computing facility was inaugurated on 7 September 1989. Dr. A. Nobile, the head of the facility, will be delighted to provide information on this new Convex C210.

Trieste, Texas Style

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A few years ago, physicist Abdus Salam, Nobel Laureate and founder of the International Center for Theoretical Physics in Trieste, Italy, suggested that a sister institute to ICTP be founded in the Western Hemisphere. Leave it to physicists from Texas to lasso the idea and rope it in. "Other places a couple of years back expressed some interest," explains David Ernst, a physicist at Texas A&M University. "We took the idea and tried to do something." In

September, Ernst and his colleague Richard Arnowitz, head of the physics department, met with Salam and several other scientists from the U.S. and Latin America to begin structuring the International Institute for Theoretical Physics. So far the IITP has a home: Texas A&M – and some initial research programs: basic physics related to the superconducting supercollider to be built in Waxahachie, Texas (The Scientist, Oct. 2, 1989, page 1), materials science, and high-temperature superconductivity. Other questions, like how closely associated with the university the institute will be, who will run it, and who will fund it are still being resolved. "My current plan," says Ernst, "is to have a backup plan." Ernst is hoping for a \$1.3 million startup budget (ICTP's annual budget is 16.4 million). "We want to complement Salam's efforts. We don't want to duplicate their research. We plan to be their little sister."

Trieste System at the United Nations

Courtesy of
Il Piccolo, Trieste, Italy,
5 December 1989

Abdus Salam ambassador of Trieste to the United Nations – Last week, the Director of the Miramare Centre delivered a speech from the UN tribune in New York in the framework of a special session on science and technology.

The Nobel Prize Laureate stressed the peculiarities of the "Trieste System", that is the complex of international institutions set up in Trieste which by now represents a secure point of reference for scientists and researchers, particularly those from developing countries – the International Centre for Theoretical Physics and the International Centre for Genetic Engineering and Biotechnology, the Third World Academy of Sciences and the future centres on pure and applied chemistry,

earth and environmental sciences, and high technology and new materials.

A convinced encouragement to the "Trieste System" came from the Secretary General of the UN, Mr. Perez de Cuellar, during a meeting at the UN with Professor Abdus Salam and Counsellor Giorgio Rosso Cicogna, Project Leader of the three new centres.

The World Bank has also shown to be prepared to support Salam's initiatives in Trieste.

OECD Development Centre Chief Urges Marshall Plan for LDCs

Courtesy of
"Special United Nations Service - SUNS",
No. 2252, 1 November 1989

The President of the Paris-based OECD Development Centre, Louis Emmerij, today called for a Marshall Plan for the world's 42 least developed countries (LDCs). Speaking in Vienna at the two-day International Workshop on the economic and development situation in the LDCs, he said "It is a special case that needs special effort ... We must put this forward in a cool, yet dramatic fashion". LDC countries were "drifting away from the mainstream", a situation which required special attention, said Emmerij, in stressing that more money should be channelled to the nations affected.

nations affected.

The Official was severely critical of the United Kingdom, the United States and Japan for the lack of money extended to the LDCs in relation to Gross National Product (GNP), as agreed upon in Paris in 1981, describing it as "disgraceful". He said the UK extended 0.13% of GNP in that year and were now allocating 0.09%, while the US had earmarked 0.03% in 1981, a figure which still remained today, with Japan giving 0.07%, again with no change now. "It is a scandal," said Emmerij, stating that the LDCs "need and deserve" special attention ... special contracts.

"We must elaborate development contracts between the OECD and LDCs ... long-term and comprehensive. It is not only development assistance, international finance, trade, investment and export credits - the whole package should contain LDC components," he said.

Emmerij pointed out that any new plan should contain the new consensus on development strategies and particularly emphasized the need for capacity building, investment in human capital, population, education, health and basic needs in general. He explained that there were two issues affecting development and progress in the LDCs - the internal factor, involving a lack of clear development strategies, priorities and incentives for structures, and the external factor, comprising commodity prices, which continued to decline, the international debt situation, the world economic recession in the early part of the 1980s, the price of industrial products, access to industrialized markets and the interest rates of the yen and dollar.

Emmerij urged: "We should have a joint programme of research on agriculture and energy and the creation of a science base," stressing that emphasis should not only be placed on the importance of technological transfer, but also on the transfer of science. "Without creating a purely scientific base these countries will become totally dependent technologically," he affirmed. "These technologically," he affirmed. "These should be the targets rather than the abstract 0.15% target (of 1981). This development contract is not only long-term but comprehensive. It should be a consistency between different instruments of international economic and financial relations," he said.

Earlier, Peter Jankowitsch, Vice-President of the Vienna Institute for Development and Co-operation, told the opening session that the gap between the LDCs and developing countries had widened to such an extent that "We might compare these most unfortunate countries with them belonging to a

different solar system". He declared: "The special problems of the LDCs need to be placed within the context of the North-South, or rather, South-North dimension," he said, adding "We in the North very often lack in understanding for the historical dimension of the development process ... We simply forget that it took us prolonged periods of time before nation-states became unified socially, economically and culturally". "We need to muster all our stamina for the lengthy period that undoubtedly will be required for the transformation of the South". In addition, he said "It is our arrogance and ignorance of the conditions in the South that makes us prescribe inept remedies for their problems ... a prime example of this is the transfer of technologies to the South". Another reason for the reluctance on the part of the North to give better aid to the South, was the presence of "rampant authoritarianism, excessive military spending and chronic corruption", he said.

The Workshop is being sponsored by the Vienna-based Institute for Development and Co-operation to discuss the economic situation of the LDCs and review progress over the past years ahead of the United Nations Conference to be held in Paris next year.

The Third World Academy of Sciences 1989 History of Science 1989 History of Science Prize

In 1987 the Third World Academy of Sciences instituted a Prize for the best research essay highlighting the work of a scientist from a country of the Third World whose achievements had not been previously recognized.

The first of these prizes was awarded in October 1988, for an essay on some remarkable astronomical tables which were used in Damascus from the fourteenth century to the nineteenth, compiled by the computational genius Shams-al-Din al-Khalili. Some of these

tables, providing numerical solutions to the cosine formula of spherical trigonometry, were unparalleled in later centuries until the early modern period.

As a result of the enthusiastic response to the announcement of the first prize and the success of that first competition, the Third World Academy of Sciences is pleased to invite submission of essays to be considered for a **Second History of Science Prize** to be awarded in 1990.

The regulations, similar to those pertaining to the award of the first prize, are as follows:

- The essay should summarize the major achievements of a Third World Scientist prior to the 20th century, whose work has not been hitherto clearly recognized. It should indicate the impact of the scientist's contributions on his/her community and, where relevant, establish their influence on modern scientific thought.
- Essays on previously unstudied works by scholars who are already known to

the modern literature will also be considered.

- Essays on themes in the history of science which are not associated with one particular scientist or individual will also be considered.
- Essays must be written in the English language.
- The length of the essay should be between about 20,000 and 50,000 words, but these limits are not binding.
- The competition is open to scholars both from the Third World and elsewhere.
- Essays should be received by the Executive Secretary of the Third World Academy of Sciences no later than 28 February 1990 at the address given below.
- All essays satisfying the above conditions will be judged by an International Committee of experts in the History of Science appointed by the Third World Academy of Sciences.
- The 1989 Prize will consist of a medal and US\$ 10,000. It will be awarded at

the Academy in the Autumn of 1990.

- The Third World Academy of Sciences will arrange for the prize winning essay to be published in book form.
- The Committee may advise authors of other essays deemed to be of exceptional merit in what form their work could be published elsewhere. The Committee may advise authors of essays deemed to be of exceptional promise how they could improve their essays and prepare them for eventual publication. The Academy is not obliged to offer such advice.

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More Pictures of the 25th Anniversary

1. *Two Carabinieri at the entrance of the Main Building on the day of the Ceremony.*
2. *Prime Minister Giulio Andreotti arrived accompanied by Profs. A. Zichichi and S.C.C. Ting.*
3. *Prof. Renato A. Ricci represented the Italian Physical Society.*
4. *The Staff of the ICTP also had a voice in the 25th Anniversary Ceremony - the Staff Representative, Mr. Adriano Lucatello. On the left, Dr. Sigvard Eklund, Director General Emeritus of the International Atomic Energy Agency, and Prof. Daniele Amati, Director of the International School of Advanced Studies.*
5. *Prof. Claudio Villi, on behalf of the Consortium, offered Prime Minister Giulio Andreotti a bronze figure representing Minerva, the Roman goddess of knowledge.*
6. *Prof. Samuel C.C. Ting, Nobel Prize for Physics in 1976, illustrates briefly the new CERN project "Eloisatron".*



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Future Activities at ICTP

1989	
Workshop on Telematics	6 - 24 November
ICTP & INFN Course on Basic VLSI Design Techniques	6 November - 1 December
Third Autumn Workshop on "Atmospheric Radiation and Cloud Physics"	27 November - 15 December
1990	
Winter college on high resolution spectroscopy	8 January - 2 February
Workshop on composite media and homogenization theory	15 - 26 January
Second college on variational problems in analysis	29 January - 16 February
Training college on physics and characterization of lasers and optical fibres	5 February - 2 March
Workshop on reactor physics calculations for applications in nuclear technology	2 February - 16 March
Fourier optics and holography	6 - 9 March
Experimental workshop on high temperature superconductors and related materials (basic activities)	12 - 30 March
Workshop on group theory from a geometrical viewpoint	26 March - 6 April
Spring school on string theory and quantum gravity and workshop on string theory	23 April - 4 May
Spring college in condensed matter on: Physics of low-dimensional semiconductor structures	23 April - 15 June
Trieste conference on topological methods in quantum field theory	7 - 11 May
College on recent developments and applications in mathematics and computer science	7 May - 1 June
First ICFA school on beam dynamics and engineering of synchrotron light sources	14 - 25 May
College on atmospheric boundary layer physics:	28 May - 22 June
I - "Modelling of the atmospheric flow fields"	28 May - 8 June
II - "Air pollution modelling for environmental impact assessment"	11 - 22 June
Miniworkshop on quantum chaos	4 June - 6 July
Adriatico Research Conference on Quantum chaos	5 - 8 June
Conference on lasers in chemistry	11 - 15 June
Low dimensional semiconductors	12 - 15 June
Miniworkshop on strongly correlated electron systems	18 June - 27 July
Research workshop in condensed matter, atomic and molecular physics	18 June - 28 September
Summer school in high energy physics and cosmology	18 June - 28 July
Adriatico Research Conference on Quantum Fluctuations in mesoscopic and macroscopic systems	3 - 6 July
Adriatico Research Conference on Quantum fluctuations in mesoscopic and macroscopic systems	3 - 6 July
Adriatico Research Conference on "Physics of strongly correlated systems"	10 - 13 July
Adriatico Research Conference on Defects in HCP crystals	14 - 17 August
6th Trieste IUPAP Semiconductor Symposium on "Hydrogen and semiconductors: Bulk and surface properties"	27 - 31 August
Working party on electrochemistry - Condensed matter aspects	27 August - 7 September
International conference on medical physics	3 - 7 September
College on medical physics	10 - 28 September
School on qualitative aspects and applications of nonlinear evolution equations	10 September - 5 October
College on neurophysics	1 - 19 October
College on structured design of real time software	1 - 26 October
Workshop on limited area modelling	8 - 26 October
Third autumn course on mathematical ecology	29 October - 16 November
Workshop on earthquake sources and regional lithospheric structures from seismic wave data	19 - 30 November

Experimental workshop on high-temperature superconductors and related materials (advanced activities)	26 November - 7 December
Workshop on oceanography	3 - 14 December

For information and applications to courses, kindly write to the Scientific Programme Office.

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EDITORIAL NOTE: This issue of the Newsletter is devoted to the 10th anniversary of the founding of the International Centre for Theoretical Physics (ICTP) in Trieste, Italy. The Newsletter is published quarterly and is available to all members of the International Centre for Theoretical Physics (ICTP) and to all interested persons.

1 - 14 December	Workshop on Nuclear Energy
15 - 19 December	Workshop on Nuclear Energy
20 - 24 December	Workshop on Nuclear Energy

The International Centre for Theoretical Physics (ICTP) is pleased to announce the following activities for the period September/October 1989.

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EDITORIAL NOTE - *News from ICTP* is not an official document of the International Centre for Theoretical Physics. Its purpose is to keep scientists informed on past and future activities at the Centre and initiatives in their home countries. Suggestions and criticisms should be addressed to Dr. A.M. Hamende, Scientific Information Officer.