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Edited by K. J. Miller

Excerpt

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## Inauguration ceremony

Inaugural address  
by  
The President of Pakistan  
General Mohammad Zia-ul-Haq



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Federal Education Minister, Mr Muhammad Ali Hoti;  
 Vice-Chancellor of the Quaid-i-Azam University, Dr Ahmed Mohiuddin,  
 Former President of the Royal Geographical Society, Lord Shackleton;  
 Leader of the Chinese delegation, Professor Zhang;  
 Honourable delegates; and  
 Distinguished Guests;  
 Assalam-o-Alaikum

I am thankful to you for giving me the honour to inaugurate this international conference on Earth Sciences. I am also thankful to the Royal Geographical Society that it selected the great Karakoram Range as its subject for scientific research to celebrate its 150th anniversary. I welcome all participants of this important conference, particularly foreign delegates, and I hope necessary facilities will be available to them to make the expedition a success.

A welcome aspect of this Conference is that besides Pakistan, prominent experts from our great neighbour, the People's Republic of China, and from a developed country of the West, Britain, are taking part in the Conference. In modern times, the task of scientific research has become so complicated and expensive that countries instead of monopolising science and technology should undertake such work with one another's association. It is necessary that the developed and the developing countries should co-operate with one another in this field so that the entire human race should benefit simultaneously from scientific knowledge. This association and co-operation will help accelerate the speed of scientific advancement.

Pakistan is not only desirous of research promotion in the field of science and technology but is making all necessary effort in this respect within its resources. Besides other sectors we are concentrating on two aspects (1) research for increase in agricultural productivity; and (2) discovery of the country's resources of energy and their development.

In the first sector, the Pakistan Agricultural Research Council is endeavouring to bring about a revolution with the help of modern research, so that we should not only be self sufficient in agricultural requirements, but should also meet the needs of other countries. In the field of development of energy we are trying to discover all resources of energy and develop existing ones so that our energy requirements are met locally. In this connection the sources of energy which are being given special attention include, besides the search for oil, solar wind, hydro, bio-gas, geo-thermal energy resources etc. We hope that by developing these sources, we would attain self-sufficiency in the field of energy.

In the context of Pakistan, I wish to emphasise that we have reached a stage in the field of science and technology, including Earth Sciences, where we have left behind the dark ages of the past. But we have to go a long way to achieve our objective. By the grace of God we have among us noted and competent scientists who are working with devotion in their respective fields. They need further opportunities and facilities to advance their work. This is being looked after. The Government has high hopes that these experts who are working in the fields of agriculture, water and mineral resources, will achieve results. In many sectors of life such as agriculture and industry, the advancement, to a large extent, is due to their efforts. I expect

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from these scientists and engineers, as also from our universities and research institutions that with their research they should find solutions to problems facing Pakistan. I have in mind particularly those research sectors on which depends our agricultural, industrial and mineral development.

Like Pakistan, other countries are also engaged in research in science and technology to suit their requirements and meet their priorities. I feel very strongly that it is necessary to benefit from the efforts of individual countries and to co-ordinate their work to mutual advantage. The Karakoram Project 1980 is an admirable example of such international association and co-operation. I hope that the Pakistani, Chinese and British scientists, engineers and surveyors will consider all those aspects which are important for the present and the future.

I have in view those research fields which relate to floods, mineral wealth, underground resources of energy, hazards of earthquakes and their prevention. Surely, in your capacity as experts in Earth Sciences, when you undertake this expedition, new vistas of research will dawn on you.

I wish this tripartite association was extended to other countries and other centres of research, so that more and more people should benefit from it. The Pakistan Government will co-operate to the fullest possible extent.

The other thing I want to emphasise is the need for a constant liaison and co-ordination between the sciences and their application. What I mean is that the research should be put to test in practical life and the information gathered in actual expeditions should be used in the advancement of research itself. The Karakoram Project 1980 will, by the grace of God, prove extremely useful in this respect. I hope that besides the civil, mechanical and electrical engineers, experts in Geology, Geophysics and Science of Survey who are associated with this Project, will bring out important and useful conclusions. Moreover, it is a rare opportunity for Pakistani experts in scientific and research fields to work in co-operation with the delegates of the People's Republic of China, on the one hand, and the representatives of the developed countries, like Britain, on the other. We can learn a lot from these countries in the field of science and technology.

I hope that Pakistani scientists and experts will not only benefit fully from this Conference, but will also help make it a success.

For us, the Karakoram Range is important, as it links our country with our great neighbour, the People's Republic of China, with whose co-operation the great Karakoram Highway has been constructed. This mountainous region has been the centre of attraction to great scientists and travellers of Pakistan in the past. The geographical and scientific information collected by those travellers and scientists, along with their experience, has made a valuable contribution to the Earth Sciences.

I am sure that after the three-day Islamabad Conference, the expedition which will be sent to the Karakoram will be more fruitful and meaningful than previous expeditions.

The inspiration behind this meeting, and the proposed expedition, is the Royal Geographical Society, which has served, for the last 150 years, the science of geography.

The Society has made a great contribution in collecting topographical information on land and sea and about new species of vegetation. I hope the proposed expedition will be successful.

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We have deep relations with the People's Republic of China resulting in useful co-operation and association in many fields. I am happy that our Chinese guests are present here. We appreciate their association with respect and expect that the friendship and co-operation between the two countries will be further promoted.

I also appreciate the efforts of the Quaid-i-Azam University, which has organised this important international Conference. Such a Conference is in accordance with its fundamental objectives. I hope that this University will continue to perform the same role in the field of research and knowledge.

I, once again, thank you for inviting me to inaugurate this Conference. I wish to pray that God Almighty may grant success to your efforts which should lead to the welfare of humanity.

Amen.

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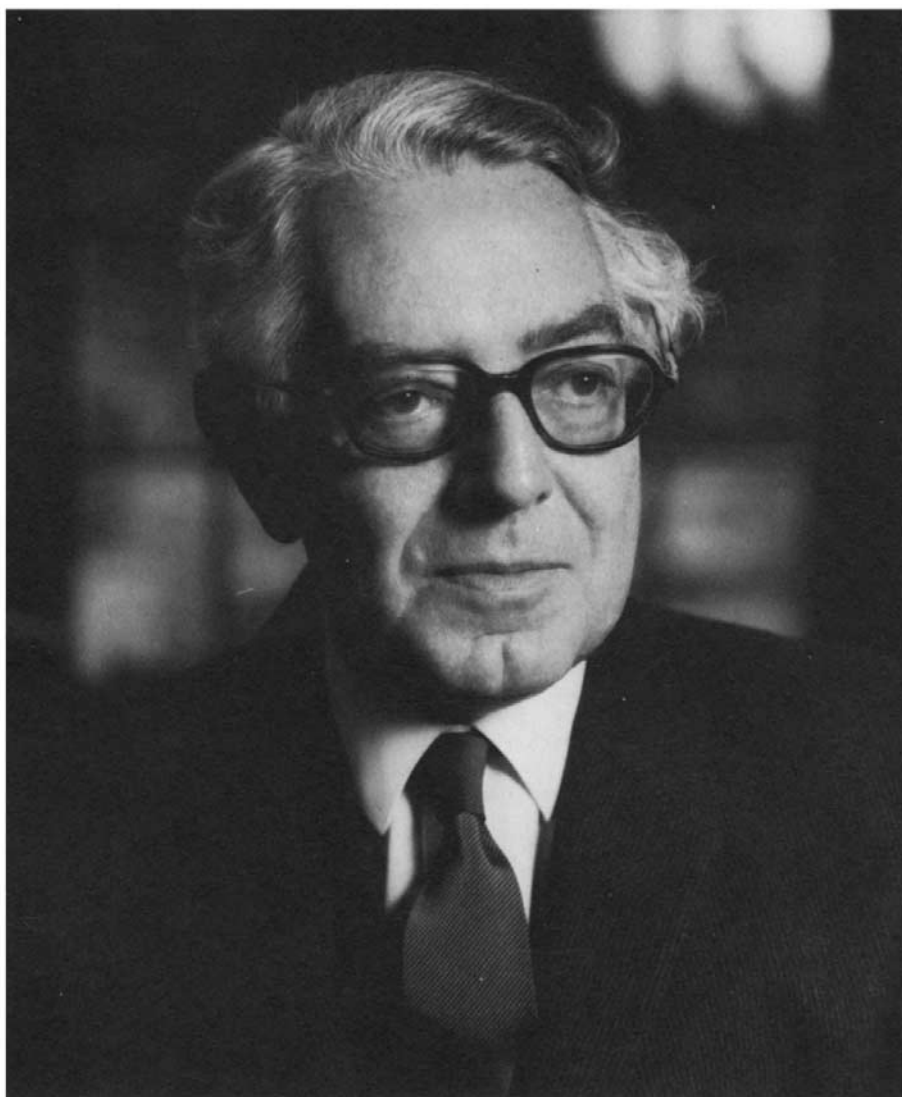
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**Address by  
Lord Shackleton K.G.**



Mr President, Your Excellencies, Ladies and Gentlemen:

We, the members of the British part of this international project, consider it a very great honour that you, Mr. President, should have consented to inaugurate the conference that initiates it. It is a notable fact that the Royal Geographical Society has always been able, because it is by its very nature, working for the increase of science and for the good of mankind, to have the support of responsible national leaders for its expeditions. I remember being told as a small child how the Queen at that time, that is Queen Alexandra, came on my father's ship before he went to the Antarctic, and only a fortnight ago we celebrated the 150th anniversary of the foundation of the Royal Geographical Society, and the present Queen of England and Prince Philip honoured us by their presence.

One hundred and fifty years ago, the scientists and adventurers of that day were concerned with some of the great geographical secrets; the discovery of the North West Passage, and then later on the discovery of the sources of the Nile and the Niger. The controversies then aroused (and that still go on) over the sources of these and other rivers such as the Oxus, have filled the minds of scientists and explorers for many years. Throughout this time, the Royal Geographical Society has sought to combine the requirements of high academic quality with a sense of responsibility for the scientific work that was being done; a combination of adventure and science. It is in keeping with these ideals that when Captain Scott's body was found in the Antarctic, there should have been found beside it the geological specimens that he brought back from his epic journey. We, who in a later generation were fortunate enough to take part in expeditions and explorations, particularly remember the work of some of the great pioneers in this part of the world also, in this wonderfully beautiful area that I was enabled to see today when I flew to Gilgit, men such as Colonel Mason, who was my tutor at Oxford and who taught me about the art of the surveyor. There will be some surveyors in the audience today, and they will be aware of the new techniques whereby they no longer have to carry a heavy theodolite to find their position, but can use other and more sophisticated devices. Indeed, some of the equipment that Professor Keith Miller is producing is so accurate that it would enable us to ascertain the exact position in latitude and longitude of where I am standing at this moment, to within a few metres.

So this expedition, this international project, has a new look about it; and it is significant that, in this 150th anniversary year of the Royal Geographical Society, we should seek both to carry on past traditions and to make new advances. The credit for the philosophy and for much of the thinking behind the project belongs to its leader, Keith Miller, who is trying not only to make progress in the quality of the sciences concerned, but to apply the results in technological terms; to apply them in a way that will be of practical value. For instance, the work of the surveyors will directly contribute to the research of other scientists in Pakistan. The work of the glaciologists will be related to the study of what is perhaps the greatest wealth that belongs to Pakistan, apart from her people, namely the water that is locked up in the glaciers. It is a resource that can be of great benefit, even though it can also, on occasion, do great harm. They will study these glaciers, working alongside the geomorphologists, in an area where the landscape changes its shape probably more frequently than anywhere else in the world. In this context of land movements, we may note that the seismologists, the Pakistani, the British and the Chinese (who have amassed so much valuable knowledge of earthquakes) will be looking at the fundamental problems resulting from the collision of the tectonic plates in the Karakoram.

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Finally we hope to learn something about how the people who live in these earthquake-ridden areas are able to build houses that withstand earthquakes, and to produce information that will be of great application.

We are very grateful that we have been granted the privilege, in this 150th year of our Society, of co-operating in a great international project; to have the support of the Chinese Academy of Sciences, of the University Grants Commission of Pakistan, of the Quaid-i-Azam University, of the British Council and of our own Ministry of Overseas Development. Moreover, many other bodies in Britain, such as the National Environment Research Council and the Royal Society, have recognised the importance of this work and have made contributions, along with the world of business and industry, towards the finance and resources that are required. I believe that this project is an example of the way in which mankind can co-operate peacefully for the benefit of us all. In the Antarctic there is co-operation, as I so well know, and although this is a troubled world, it is my belief that here in Pakistan also this project will show that, by working together on research involving the inter-relationships of several disciplines, the scientists of three great nations can contribute to the welfare, not only of Pakistan, but also to the welfare, and to the peace, of mankind.

Thank you.

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**Address of welcome**  
**by**  
**Mr Muhammad Ali Khan**  
**Minister for Education, Culture and Tourism**

Honourable President, delegates, ladies and gentlemen.

It gives me profound pleasure to welcome you to this "International Conference on Recent Technological Advances in Earth Sciences" which is being held for the first time in Pakistan with the co-operation of experts from the United Kingdom, the People's Republic of China and our own scientists. The assembly of so many distinguished experts today is of special significance as they will be working jointly on a project which is expected to augment human knowledge.

Mr. President, we are grateful to you for sparing time out of your busy schedule to be with us at the inauguration. This should certainly inspire scientists in their efforts to develop new avenues of research. Your very presence here indicates the paramount importance you attach to the development of sciences and research in Pakistan.

This Conference is a prelude to the International Karakoram Project 1980, which is being sponsored jointly by the Royal Geographical Society, London, Academia Sinica, Beijing, and the Government of Pakistan. While this Conference will review the work done so far on Himalayan Studies and associated subjects, the Karakoram Project is expected to advance our knowledge of the Himalaya. The experts understandably will deliberate upon the store of knowledge pertaining to this great tertiary uplift and the treasure of precious material lying buried there. Their findings during discussions and later work in the field will certainly have a bearing on the development of resource material to be utilised for the promotion of scientific studies and the good of mankind.

Mr. President, this Conference, it is hoped, drawing upon the expertise of the three participating nations, will stimulate research in other countries. Besides the material benefit that might accrue to Pakistan and the neighbouring countries, the expedition will provide scientific data for study in the research institutions of the world. Local organisations, directly involved in this project in particular, will gain salient experience to improve their techniques and enter upon further research work.

Some fifty years ago, a Yale-Cambridge expedition for the first time explored the Himalayan glaciation under the leadership of H.D. Terra in co-operation



with teams from the U.S.A., U.K., France, China and the Indo-Pakistan Sub-Continent. The team for the first time catalogued the flora and fauna of the glacial region in a chronological order. Their important work entitled "Study in the Ice Age in India and Associated Human Cultures" is the only standard work so far available. Since the early thirties of the present century when the expedition was organised, we have advanced progressively in our scientific and technological knowledge and also in developing new equipment which will be used in the present project. Research will undoubtedly contribute to enriching our knowledge of the Great Himalayas lying between Pakistan and China. We have co-operated successfully with our great friendly neighbour China in different fields of mutual interest in the past. In this particular expedition too we are grateful to our Chinese friends for their collaboration. We are indebted too to the Royal Geographical Society, London, for sending its team of eminent scientists and technologists to take part in the project. I welcome the guest experts and wish them success in their deliberations.

The Government of Pakistan has been making efforts to support institutions within the country which are seriously engaged in this type of research. Among them the Survey of Pakistan and the Geological Survey of Pakistan were founded during the British days and have carried on their work in the light of new developments in science and technology. There are a number of other institutions which Pakistan has established after independence. These have opened new fields of research for the benefit of the country. On the teaching and research side, we have established Departments and Institutions of Geology in most of our Universities. A Centre of Excellence for Mineralogy and Petrology has been established in the Baluchistan University. Other organisations such as the Water and Power Development Authority, the Pakistan Mineral Resources Development Corporation, the Industrial Development Corporation of Pakistan and the Mineral Development Authorities in the Punjab and the N.W.F.P. have contributed as well towards our advance in this field. Of significance too, is the establishment of the Department of Geophysics under the Institute of Earth Sciences at the Quaid-i-Azam University. A proposal is also under consideration by the University to create a "Karakoram Research Cell".

We are obliged to the Royal Geographical Society, which is celebrating its 150th anniversary, for choosing our country as a base for research that is likely to benefit mankind in the long run.

I thank you once again Mr. President, for acceding to our request for inaugurating this Conference. I also thank the delegates and other guests who have made it convenient to be present here this evening.

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## Some recent technological advances applied to problems in earth sciences

K.J. Miller

University of Sheffield, England

Leader, International Karakoram Project 1980

### OPENING REMARKS

This lecture inaugurates the International Karakoram Project, 1980. It is therefore opportune to emphasise the aims of the Project which were agreed two years ago by the Royal Geographical Society, to commemorate its 150th birthday. The Project was to facilitate international co-operation between scientists, promote inter-disciplinary research work, and seek inter-Governmental support, all of which have now been achieved. It is my hope that this venture will now set a pattern for others to build upon in future collaborative investigations.

I recognise that I am most fortunate in being both an engineer/materials scientist and a geographer/mountaineer. It is this dual existence that permits me to address you today on a topic that I consider to be closely related to the stability, peace and prosperity of mankind. In the International Karakoram Project, we have scientists from China, Pakistan, Britain and Switzerland, assisted by advisers from Italy and the U.S.A., plus many other countries. The papers read at this conference are concerned with geographical, geological, geomorphological, glaciological, engineering and human problems and they invoke theoretical and experimental studies in engineering, physics and chemistry which examine materials and structures ranging from atomic dimensions of ice crystals ( $10^{-10}$  m) through to the global dimensions of tectonic plates ( $10^6$  m) i.e. 16 orders of magnitude.

The fact that such a wide ranging Project and conference could be held is due to the efforts of countless people, many of whom had no hope of direct participation either at the conference or in the Project itself. Those who laid the foundations for our studies in the late 19th and early 20th centuries have presented us with a unique opportunity which we gladly accept. To all those past and present helpers, including those present here today, I, on behalf of the Project and The Royal Geographical Society, give thanks and hope that we may repay the trust given to us by producing scientific results of benefit to the people of Pakistan.

Einstein once said that Pure Science makes history, whilst Applied Science makes progress. I am tempted to say "Theoreticians tell us what is feasible, whilst technologists are responsible for providing society with an economic,