

## A Move into the Field of Academic Work

After defending my doctorate, I returned to Ulaanbaatar and telephoned Tsendenbal the next day to let him know of my arrival.

The chairman arrived on time for our meeting and immediately greeted me in a pleasant manner, "It is good of you to have arrived so quickly after receiving my letter and without being able to defend your doctorate." When I told him that I had put my signature to the summary of the dissertation, his expression changed completely "Why do you look so unhappy if you have successfully defended it?" he asked. "Yes, that's right," I replied.

He continued, "We are putting you in charge of the Central Council of Trade Unions." "Having previously done all kinds of official work, my health is not suited to leadership duties. So, will you move me to an academic post, as we have so few people with a doctorate?" I asked. Tsendenbal replied, "In that case, since the Institute of Science and the state university have merged, you could go there." I agreed that that was what I wanted. I went home and felt very pleased at my good luck in being appointed to work in the Institute of Higher Education and Science at my own request.

Between 1959 and 1960, within the framework of the Institute of Higher Education and Science, the groundwork was laid to establish an Institute of Social Sciences, and departments of Animal Husbandry, Natural Sciences, and Medical Sciences. Shortly afterwards, following a resolution of the Council of Ministers passed on February 3, 1960, the Department of Animal Husbandry was moved to the College of Agriculture, and the departments of Natural Sciences and Medical Sciences became a joint department in the university. This left only the previously established Department of Social Sciences at the Institute of Higher Education and Science.

I was confirmed as president of the Institute of Higher Education and Science at the first session of the fourth Ikh Khural on July 6, 1960. I took up my post and went to visit the organizations associated with the Institute to get to know the staff and the things they were doing.

During the election of the Ikh Khural, I met with the electors of the fifty-third ballot of Sükhbaatar aimag. On my return from the international Anti-Nuclear Conference in Tokyo, I learned about the organization of teaching at the state university. After several hundred years of feudal oppression and exploitation by the greedy Manchu-Chinese traders, there was great poverty and destitution. The seemingly eternal struggle of the impoverished Mongolian people led to an awakening by the light of the October Revolution. Their enthusiasm was kindled, and from a historical point of view, they were clearly extremely fortunate.

I used scientific principles to explain my ideas based on the materials I had gathered on Mongolian history. I hoped to explain the situation in Mongolia at the turn of the century. With this aim in mind, I wrote the works *XIX, XX зууны зааг дakh' Mongol*

oron [Mongolia in the Late Nineteenth and Early Twentieth Century],<sup>1</sup> *1921 ony Mongolyn ardyn khuv'sgalyn tüükh* [History of the Mongolian People's Revolution of 1921], and *V.I. Lenin ba Mongolyn ard түмөн* [V.I. Lenin and the Mongolian People] which were published in Russian and Mongolian,<sup>2</sup> and *Kapitalizmyg algassan n'* [By-passing Capitalism]<sup>3</sup> which was published in thirteen foreign languages.

As far as recent history is concerned, two important events occurred in our country at the threshold of the twentieth century. One determined the destiny of the Bogd Khan Mongolian Nation (established in 1911) as a consequence of the self-interests of the neighboring empires, which left a sad and indelible stain on our history. The other was the proclamation of a new Mongolian nation in 1921, with a people's government which, thanks to the new era, led to complete independence, recognized not only by her two neighbors but by the whole world as well. Thus, it would be correct to say that all mankind are forever guarding our independence.

Judging these works from a modern standpoint, they were written in accordance with the ideological framework prevailing at the time, and there are plenty of things which require adjustment. And so I feel there is room for improvement. I participated in editing and writing the appropriate chapters of the first volume of *Bügd Nairamdakh Mongol Ard Ulsyn tüükh* [History of the Mongolian People's Republic],<sup>4</sup> *Mongol zövlöitiin khariltsaany tüükh: 1921-1978* [History of Mongolian-Soviet Relations, 1921-1978],<sup>5</sup> *Delkhiin II дайны товч түүх* [A Short History of World War Two] and *Oktyabr' ba түүний дараагийн khuv'sgal* [The October Revolution and the Revolution which Followed].<sup>6</sup> I also had other books, pamphlets, and a considerable number of other articles published.

In 1971 I received an award from the government of Mongolia for my book *1921 ony Mongolyn ardyn khuv'sgalyn tüükh*, and I received an award from the Academy of Sciences for *Oktyabr' ba түүний дараагийн khuv'sgal*. I was pleased and proud to think that my humble achievements were valued by the public, and I strove to write even more. Having become president of the Institute of Science and Higher Education, I gained some ideas from the revolution taking place in science and technology. The research process and the training of personnel were considered most important.

On June 20, 1960 the Institute of Higher Education and Science made a pro-

<sup>1</sup> The Russian version is *Mongoliya na rubezhe XIX-XX vekov: istoriya sotsial'no-ekonomicheskogo razvitiya* (Ulaanbaatar: Kom-t po delam pechaty, 1963).

<sup>2</sup> The latter book's Russian version is *V.I. Lenin i mongol'skii narod*, published by Nauka of Moscow in 1970. The citation of the former book is not quite accurate. The title of the Mongolian version is *Mongol ardyn khuv'sgalyn tüükh*, published by Ulsyn Kheveliin Gazar of Ulaanbaatar in 1969 while the Russian version is *Istoriya Mongol'skoi narodnoi revolyutsii 1921 goda*, published by Nauka of Moscow in 1971.

<sup>3</sup> The English-language edition is *By-passing Capitalism: Popular Essay* (Ulaanbaatar: M.P.R. State Publishers, 1968).

<sup>4</sup> It is the third, not the first, volume that Shirendev co-edited (with M. Sanjdorj), published in 1969 (?) in Ulaanbaatar. This third volume was translated into English and annotated by William A. Brown and Urgunge Onon. It was published under the title *History of the Mongolian People's Republic* by the East Asian Research Center at Harvard University in 1976.

<sup>5</sup> Published in Ulaanbaatar. The Russian version is *Istoriya sovetsko-mongol'skikh otnoshenii*, published in Moscow. Both versions were published in 1981.

<sup>6</sup> The Russian version, *Vliyanie Velikoi Oktyabrskoi sotsialisticheskoi revolyutsii na Mongoliyu*, was published by Izdatel'stvo polit. literatury of Moscow in 1967.

posals to the leading authorities. This was highly significant for the further development of our society and its activities. It was proposed that an Academy of Sciences should be established. The time had come to divide up the committees in charge of higher education. Right from the beginning until 1965, the structure of the academy was expanded, and people capable of doing research work were released from other organizations. As these research workers were attracted into the academy, they received training in the universities of the Soviet Union and other socialist countries.

The leading scientific expertise of the Soviet Union was studied, and in later years, agreements were signed with the USSR Academy of Sciences to carry on joint research projects. These ideas were shown in advance to the MPRP Central Committee and the Council of Ministers.

After further discussions and clarification of the direction being taken, a decision was made on October 13, 1960 to establish an Academy of Sciences the following year. Additional preparatory work needed to be carried out. In December 1960, a delegation consisting of research workers, and including myself as president of the Institute of Higher Education and Science, and Ch. Sereeter as secretary of the institute's scholars, held discussions with a delegation from the USSR Academy of Sciences, and on December 12, 1960, an agreement was concluded on joint academic work.

Ye. K. Fedorov led the Soviet side in the discussions. He was a scholar, secretary, and geographer in the Soviet Academy of Sciences, and had taken part in a study of the North Pole in the 1930s. He was also a Hero of the USSR and a publicly acclaimed academician. Fedorov paid particular attention to our questions, and assisted us in all aspects of the development of science in our country.

From that time onwards, I met with him to discuss business matters concerning the work of the academy and received advice from him. We met at the CMEA (Council for Mutual and Economic Assistance) meetings, at the 1963 Geneva conference for international scholars, which discussed the introduction of science and technology in under-developed nations, at the conference of representatives of the academy of sciences of socialist countries held in Sofia in 1969, and at the conference on the peaceful utilization of space research held at the United Nations in 1968. Later on, he invited me to his home on several occasions, where we exchanged ideas during close and friendly discussions on cooperation in academic research.

Our delegation met with Academician Fedorov and several leading members of the academy. They explained the structure of research work in the USSR Academy of Sciences, and we studied some of their expertise in conducting research. As we were planning to establish institutes of agriculture and medicine within our academy, we visited the All-Union Lenin Academy of Agriculture, the associated institutes and departments of the medical academy under the Soviet Ministry of Health, and the institutes in charge of research in genetics, livestock breeding, veterinary science, farming, seed planting, soil science and immunization against viral illnesses. We received valuable advice from all of them. We were introduced to P. Lobanov, the principal academician of the Soviet Academy of Agriculture, and V. Temakov, the principal academician at the Academy of Medicine, with whom we began a working relationship.

On January 13, 1961 the MPRP Central Committee and the Council of Ministers ratified the agreement negotiated by our representatives. Research workers were transferred from certain ministries and from the university and colleges in order to do the preparatory work for the establishment of the academy. We drew up the rules for the nomi-

nation of people to become academicians and corresponding members, determined the composition of the Presidium of the Academy, drew up the academy's budget, and performed many other tasks.

In this resolution, the Politburo of the MPRP Central Committee approved the budgetary plan of the Academy of Sciences, and it was agreed that the opening ceremony of the Academy of Sciences would be held on May 24, 1961. The Presidium of the People's Ikh Khural announced the establishment of the Academy of Sciences on May 16, 1961. The Council of Ministers confirmed the regulations of the Academy of Sciences, and in its resolution of May 22, 1961 indicated the initial composition of the membership of the academy, which consisted of nine academicians and nineteen corresponding members.

Initially, the Institutes of Language and Literature, History, and Natural Sciences, the State Library, the Central Museum, the Temple Museums and the Bogd Khan Museum, were included under the academy's jurisdiction. The First Assembly of the Academy of Sciences was held on May 22, 1961, at which a seven-member presidium was established, with myself as president-elect and corresponding member Ch. Sereeter as academic secretary.

The foreign members elected included the Soviet scholar and physicist Academician M. V. Keldysh, the geographer and polar researcher Academician Ye. K. Fedorov, the Indian philosopher Sarvepalli Radhakrishnan, the Chinese literary scholar Guo Moruo, and the Hungarian Mongolist scholar Lajos Ligeti. The assembly also confirmed Academician Ts. Damdinsüren as director of the Institute of Language and Literature, the candidate scholar of history D. Tsedev<sup>7</sup> as director of the Institute of History, the corresponding member L. Baldandash as director of the Institute of Agriculture, and corresponding member J. Jamsran became director of the Institute of Natural Sciences.

On the evening of May 24, 1961, a joint celebration was held at the State Opera and Dance Theater for research workers and prominent figures in education and culture. Representatives of the working classes, collectivized herdsmen, and the capital's population took part. Party and government leaders, political activists, and the diplomatic corps in Ulaanbaatar were present at this meeting, which was celebrating the founding of the Academy of Sciences. Right at the back of the theater stage was a red flag with portraits of the founders of scientific Communist theory, namely Marx, Engels, and Lenin. There was also a bust of D. Sükhbaatar, the leader of the People's Revolution and founder of the MPRP and people's government. As president-elect of the Academy of Sciences, I opened the meeting with a speech.

Our ancestors desired a scholarly education and learned books, as parched ground craves rain. If not today, then by tomorrow, our scholars will uncover the generous wealth of our birthplace to turn it into a wealthy nation. Our science will, if not tomorrow then the day after, profitably utilize the riches of our soil, the farmland, the livestock economy, forests, and rivers. Perhaps not even the next day, but one day, our science must overcome the technical problems which confront us. We will strive to complete this work in as short a

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<sup>7</sup> Dojoojiin Tsedev, born in 1940, has edited many works on the history of Mongolian literature. He is also the author of a work on the history of Mongolian poetry which was then translated and published as *Modern Mongolian Poetry, 1921-1986* (Ulaanbaatar: State Publishing House, 1989). Tsedev has also published at least one volume of his own poems.

time as possible. With the power of science, we hope that the time will arrive when we will ameliorate the cold of winter, the harshness of the wind, and moisten the soil of the Gobi.

Tsedenbal made a speech during this celebration, and congratulatory speeches were made by Sharav on behalf of the working classes, by the writer Ch. Lodoidamba<sup>8</sup> on behalf of the intellectuals and by a negdel milkmaid named Tsermaa on behalf of the herding-collectives. Scholars and research workers offered their congratulations and thanks to the MPRP Central Committee and the Council of Ministers. Pioneer pupils bearing flowers entered the hall amidst the resounding sound of trumpets and drums. This was a proud, celebratory event for people of all ages. Warm congratulations and good wishes were offered on behalf of young people in conjunction with the establishment of the Mongolian Academy of Sciences. This was the manner in which our people proudly received the establishment of the academy. The Academy of Sciences of the Soviet Union and other socialist countries and several associated organizations and famous scholars sent congratulatory telegrams which were read out at the conference.

Congratulatory cards and telegrams addressed to the meeting arrived from the English professor of physics J. D. Bernal, the Finnish scholar of Mongolian Pentti Aalto,<sup>9</sup> other higher institutes of the Mongolian State University, all ministries, specialist centers, aimag Party committees, the executive committee of the National Assembly of Deputies, and other places. Following the meeting, an interesting celebratory concert was given by selected, talented artists.

The 1961 annual conference of the Academy of Sciences confirmed the 1961-1965 five-year academic plan. This plan focused on the most challenging problems of the livestock economy, the study of pasture and vegetation, veterinary science, medicine, history, language, literature, geography, geology, botany, and economics.

The MPRP Central Committee and the Council of Ministers agreed to take account of the academic plan of the academy in the annual joint plan for the development of the nation's economy and culture. As an experiment, the Züünkharaa state farm was brought under the control of the academy's experimental station at Züünkharaa. The academy's fruit-growing station at Shaamar was transformed into a center for research into fruit growing. The Bulgan fruit-growing station in Khovd aimag was expanded. Livestock veterinary services and the industrial bioprocessing sector were developed.

The Institute of Economics attached to the State Planning Commission was established in 1963. Seismology stations were built at Tosontsengel, Khövsgöl aimag, and in Dornogobi aimag. Councils were established to coordinate the research linked with the Academy of Sciences. The state university and some colleges carried out the training of professional workers in pastoral and zoological studies. Accommodations were built for the joint Institute of Physics and Chemistry. Specialists with higher qualifications were

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<sup>8</sup> Chadraabalyñ Lodoidamba, born in 1917 (some sources say 1916), distinguished himself as a writer of novels and short stories, particularly his *Tungalag Tamir* [Clear Tamir], first published in 1962, a novel about a river in eastern Arkhangai aimag, which has been reprinted and translated several times since then. He also translated into Mongolian *The Headless Horseman* by Mayne Reid (1818-1883). Lodoidamba died in 1970.

<sup>9</sup> Pentti Aalto, born in 1917, has been a major figure in Altaic and comparative linguistics. He is perhaps best known for his two-volume *Latin Sources on North-eastern Eurasia*, co-authored with Tuomo Pekkanen (Wiesbaden: Harrassowitz, 1975-1980), *Oriental Studies in Finland, 1828-1918* (Helsinki, 1971), and *A Catalogue of the Hedin Collection of Mongolian Literature* (Stockholm, 1953). On the occasion of his seventieth birthday, a festschrift was published under the title *Studies in Altaic and Comparative Philology* (Helsinki, 1987).

transferred to the academy and highly-qualified research workers were trained every year. Later on, research staff were trained for annual reaccreditation. Between 1961 and 1965 the number of research workers increased from 178 to 353, and research assistants increased in number by 210 from the 1400 working in 1961.

During the first five-year period, 1961-1965, over eighty single-subject projects were initiated, and 216 other research tasks were completed in addition to several innovations suggested for implementation in industry. The Orkhon breed of sheep and the Orkhon strain of wheat were developed. A study was carried out on permafrost as a result of which several cold-storage facilities were built near Ulaanbaatar. With the help of the technology of the institutes of physics and technology, chatsargana (Sea Buckthorn)-based oil was produced. A profit of over ten million tögrög was made from the sale of academic research publications during this five-year period.

The Academy of Sciences encountered considerable difficulties during its early years, particularly in the training of specialist staff and in carrying out academic work, where there was a lack of expertise. Leading people repeatedly criticized the organization of the Academy of Sciences in official documents, claiming that it had become "incapable of standing on its own two feet." Time and again Tsedenbal would quote Stalin's phrase "those bookish know-it-alls" in his speeches.

But that was not all. He openly declared that as research in natural philosophy, technology, and economics was being conducted in the Soviet Union and other socialist countries, extra expenditure on these subjects was not necessary. The number of staff and the budget were not only frozen, but even reduced on a few occasions.

As scientific and technical studies developed, much effort was directed to the proper explanation of the social and economic reasons behind the selection of important fields and subjects of research. The scientific part of the new program of the MPRP as ratified by its Fifteenth Congress in 1966 went as follows:

- All possible means will be used to develop natural, technical, and social sciences, and extensive training of research workers will be carried out.
- Academic research is to be directed towards the intensification of agriculture (raising the quality of livestock, grain, and vegetables and improving the livestock stations) and the prospecting for natural resources and their exploitation.
- Mongolia will concentrate on following the experience of socialist organizations following a non-capitalist route of development, and will study questions related to the international movement of Communist workers.
- To raise the theoretical standard of research work in conjunction with the rising demands of modern society, science, and technology. To strengthen the links between academic research work and its practical application.

These various aims were implemented in coordination with the Academy of Sciences, as the second academic five-year plan was carried out between 1966 and 1970. With the help of the Soviet side in a joint Mongolian-Soviet geological expedition, we drew up geological, tectonic, and seismological maps, and studied several important areas from the perspectives of stratigraphy, paleontology, petrology, and geochemistry.

During this period, our biologists studied many aspects of wild mammals, fishing, and game resources. The chemists carried out extensive studies of the chemical composition of all kinds of natural and raw material reserves. Geographers studied the natural vegetation zones of our country and the basic composition of ancient permafrost

rock, and the main sectors of the national economy with the aim of producing maps for middle schools and colleges. Economists produced estimates of the growth of the population up to the year 2000, and carried out, among other things, projections of the economic development of the country and the optimum composition of the livestock herds.

Physicists and mathematicians studied some theoretical problems in nuclear physics, studied observations and photographs made by satellites, and produced the necessary equipment for the processing of certain kinds of vegetable-based raw materials. Historians published the three-volume "History of the MPR," and linguists compiled and printed a considerable amount of literature of historical significance and a grammar of the Mongolian language. The academic work produced by the academy in the 1971-1975 period included some concrete results, such as standard-scale and large-scale maps and various suggestions of practical importance.

As a result of the pressure applied by certain ministries, in 1968 the control of several research institutes was transferred from the academy to those ministries. These included the institutes which were under the control of the Ministry of Agriculture and the Medical Institute, which came under the Ministry of Health.

In 1968 the Politburo of the Party Central Committee passed a resolution which brought all museums under the control of the Ministry of Culture after 1969. Some people felt that the practical application of the work of those institutes under government control should be the main aim of research. However, they were unable to achieve all these aims. Some of the ministries directed these newly-acquired former institutes of the academy to do everyday routine tasks and made them into subordinate organizations. They were expected to spend time writing reports, issuing directives and plans, and doing other work of little significance.

In November 1971, the staff of the Academy of Sciences marked the fiftieth anniversary of the first scientific organization in our country, known as the Institute of Books, and the tenth anniversary of the Academy of Sciences. The scientific and cultural achievements of the country were highly valued, and a decree of the Ikh Khural conferred the Order of Sükhbaatar on the academy. In addition, the prestigious title, Merited Scientist of the MPR, was created.

At a gathering during the anniversary conference I read a report entitled "The Fiftieth Anniversary of Mongolian Science." Representatives from the academy of sciences of the Soviet Union, Bulgaria, East Germany, Poland, Czechoslovakia, Romania, and other countries made speeches and presented congratulatory citations from the presidents of their respective academies. Furthermore, those who were present were informed that letters of congratulation had been sent to the conference from the scientific organizations of foreign countries, various scholars, ministries and special departments of the Mongolian government, and other organizations.

From 1975, the Institute of Physics and Mathematics became the Institute of Physics and Technology and the Institute of Mathematics. In addition, the Institute of Biology was broken up into the Institute of General and Experimental Biology and the Institute of Botany. Improved accommodations were agreed to for the Information Department and the Research Supplies Department.

During the first half of 1980 the following institutes became part of the Academy of Sciences: the Institute of Geography and Permafrost Studies, the Institute of Geology, the Institute of Chemistry, the Institute of Far Eastern Studies, the Institute of Physics and Technology, the Institute of Philosophy, Sociology and Rights, the Institute

of Botany, the Institute of Industrial Development and Distribution, and the Institute of History, which happened to be the academy's first institute at the time of its founding in 1961.

After the Institute of Mathematics had been established, computers came into use and we began to receive important advice from people such as A. Dordnitsin, a regular member of the USSR Academy of Sciences and principal of the Mathematics Center, and Il'ev, a secretary and scholar of the Bulgarian Academy of Sciences. The Soviet Academy of Sciences offered us trained personnel and the Bulgarian Academy of Sciences donated the Analog-1 computer which they themselves had constructed. This machine is still working to this very day.

The organizational structure of our research organizations was, in the main, exactly like that of the majority of such organizations in the other socialist countries. These were created out of the institutes of the academy, the laboratories, the multidisciplinary chairs in the university, and the colleges and institutes carrying out work in subordinate subjects which had been established alongside the ministries and special departments. In addition to carrying out its own responsibilities, each part of this system played a clear role in the implementation of a united policy in science.

This unique organization of the Academy of Sciences in the Soviet Union (and later on in other socialist countries as well) was also established in our country. Following the supervised transformation of the Academy of Sciences, in 1974, the Council of Ministers ratified the new character of the reorganized academy. In its original form, the Academy of Sciences was a higher research organization of Mongolia which united distinguished scholars in their socio-political activities. The academy's aim was to develop the foundations for studies in the most important areas of natural and social sciences. It was pointed out that this would help to establish socialism.

When making a distinction between fundamental and subordinate academic work, each of these two scientific areas would be influenced by socio-economic factors. In the end, we tried to work in clearly different ways, based on whether we wished to directly or indirectly influence the material wealth or intellectual life of the country. When getting to know the profound processes which occur in nature and society and the basis of the principles underlying them, logic was revealed in the results of directed research, and previously unrealized new tendencies were uncovered.

The quality of life can only be evaluated by drawing conclusions from the material gathered. If one considers a scientific principle which is used as a formula to understand material objects, it will be found in the laws of physics and the recognition of how this law is reflected in human understanding. To fulfill this responsibility, science began to gather a huge amount of information and, having examined it, managed to record it clearly. When mankind was finding out about the universe, the main methods of testing and the main research techniques were used. The solving of problems turned to using research for the sake of testing theory. Things which could be perceived and recognized were investigated, conclusions were drawn, and there were discussions about the utilization of the most important categories of scientific understanding.

Science is also about categories, hypotheses, and abstract systems comprised of theoretical matters. These areas of scientific study include natural and social processes, objective phenomena and powerful forces. For this reason, science is an information system for nature, society, and knowledge. The creation of science and its development have been clarified through industrialization and social practice. Science remains rela-

tively independent through these processes. Why this relative independence of science? Science incessantly focuses the other forms of scientific and social understanding and in turn these influence economics, political policy, ethics, art, and religion.

A recent phenomenon is the further classification of science. The Academy of Sciences was shaped between 1961 and 1981, during which time the direction of research work was established. Skilled workers were trained, laboratories were established, and foundation courses were jointly set up.

One of the original establishments within the Academy of Sciences was the State Library, where around three million books and rare hand-written manuscripts are held. Rare manuscripts are held in the Mongolian, Tibetan, and Oriental literature collections. Among them are the books of past and present Mongolian scholars, the 109 thick volumes of the *Ganjuur* and the 226 volumes of the *Danjuur* in Mongolian and other translations of famous books and manuscripts. The encyclopedia-like *Ganjuur* and *Danjuur* are two works of translations and explanations of ancient Indian philosophy, medicine, art, and astrology.

The Academy of Sciences had publishing facilities capable of producing over 1000 pages of different kinds of research from its various branches.

Besides conducting foundation courses, the links between subordinate courses and productive industries were strengthened and further scientific ideas were taken up and implemented, generally successfully. The institutes of the main branches and the research planning organizations and laboratories began to direct the subordinate research which was aimed at developing plans, programs, technology, and suggestions for further research. Although the subordinate courses had a useful and active influence, the experience of world science continued to show the importance of first developing the foundations of science.

Some of the university and college professors, lecturers, and the graduate and senior undergraduate students carried out research work independently, or else in theoretical fields subordinate to the working plan of the academy and its branch institutes. This was supported on all sides by the academy, the university, the colleges, and the branch institutes. It was well known that if this work was further intensified it would have been useful for the development of our science.

All the science departments collected statistics on our country's minerals, raw materials, vegetation, mammals, economy, and livestock which were used in the writing of original text books for middle schools and colleges. Sometimes translations and "Mongolizations" of foreign language books were made so that teachers and pupils could become knowledgeable about some of the characteristics of our country. It was thought even more important to present the world's scientific advances in a way which suited the Mongolian way of thinking.

Despite the fact that the above ideas were put forward on more than one occasion, it is regrettable that they were not heeded by the college and middle school leadership of the time.

It was particularly important that laboratories for the natural sciences were established in the Academy of Sciences with new and up-to-date equipment and instrumentation. With the help of some of the member countries of the Council for Mutual Economic Assistance, a genetics laboratory and a radio-electronics laboratory were established. A production office, a factory to produce research equipment, and a computer center were started in the academy with help from the Academy of Sciences of the Soviet

Union and East Germany.

One of the driving forces which would have increased the benefits of academic research was the composition of the trained personnel. During the twenty years following the establishment of the Academy of Sciences, people were sent on assignment to the organizations of the Academy of Sciences of the Soviet Union and other socialist countries through the channels of the colleges and to undertake postgraduate studies so as to improve their qualifications. Large numbers of skilled workers were trained by giving them experience in joint expeditions, commissions, and other work.

Out of 370 college graduates who received training between 1961 and 1981, 264 were trained at colleges in the Soviet Union. Of these, seventy-nine were postgraduates and twenty-seven were Ph.D. candidates. The colleges trained ninety-six students in physics and technology, sixty-two in chemistry, forty-nine in biology, thirty-two in geology, ten in genetics, thirty-one in economics, and about twenty in philosophy and sociology. The 178 staff members of the Academy of Sciences in 1961 had grown to 1,346 in 1980-81, including 1,061 research workers, 150 candidate scholars, and forty scholars with doctorates. To quote a few examples, in 1980 there were forty staff members in the Institute of History, 100 in the Institute of Chemistry, and more than 200 in the Institute of Physics and Technology.

The Party Central Committee issued a directive which streamlined the personnel of the research institutes in 1979-1980. This was done, in principle, to increase the benefits from their work, and while important questions were being considered, all kinds of ideas were put forward about the relative numbers of research workers in the academy and its branch institutes and the structure of the research organizations. This operation focused on the academy with the hope of destroying or moving its institutes of the natural and technical sciences elsewhere. In the main, it was those diligent students who, having studied hard in their own country's primary and middle schools and successfully completed their graduate courses in the university or in one of the colleges, were now working in the academy. However, when selecting people for research work, we were unable to pay enough attention to their natural talents, characteristics, and ability to achieve, which resulted in considerable losses.

As already mentioned, for science to develop it was important to train skilled personnel. A suggestion was made to establish a special ten-year school for talented children and young people based at School Number 14, which was to be linked to the Academy of Sciences and the Ministry of Education. Although a considerable amount of planning work was done, nothing was achieved. Some people studied after a fashion, but without knowing where to go or what to study, had prematurely entered into research work, and helped to fill the staff quota.

Attention was paid to the few people who had spent many years fulfilling regular appointments, and care was taken to employ capable people in the Academy of Sciences. All members of the staff of the Academy of Sciences were coordinated as a single unit. Similar demands were placed on each of them. Staff were educated in a climate which raised the quality of their work, and further demands were made on them to adopt an academic philosophy. We began to acquire the sort of scholars who were able to direct quite large research units in the laboratories and departments.

We took great care to carry out research in the natural, technical, and social sciences, which was important for the present and future needs of our country. Working relationships were improved and important ideas on the direction of these relationships

were raised from the time the academy was established. However, in reality, during the last thirty years the coordination of those ideas was lacking, and did not lead to increased achievements. There was a conceited attitude in conjunction with inadequate thinking and action. The decisive factor in this situation was the shortage of skilled workers and the lack of modern equipment suitable for use in research work.

The bilateral and unilateral activities agreed upon between our academy and the academies of the Soviet Union and other socialist countries undoubtedly influenced the development of our research workers, raised the theoretical standard of research work and the benefits economics flowing from it. Prior to the first signing in 1967 of a notable agreement between the presidents of the Mongolian and Soviet Academies of Sciences, many new ideas had enriched the content of these discussions. In particular, joint expeditions carried out research according to common principles and programs. The scholars coordinated and linked the work they were doing by a mutual exchange of questions. When helping to train skilled research personnel, and when it came to issuing scientific news and announcements, it was agreed that there would be such things as a mutual exchange of relevant publications.

Those who took an active part in the signing of this agreement included the president of the USSR Academy of Sciences M.V. Keldysh, his deputy M. D. Millionshikov, and M. A. Lavrent'ev, and A. A. Logunov. Keldysh had been appointed president of the USSR Academy of Sciences in May 1961. I met him many times and received advice from him on establishing priorities in physics, mathematics, science, and technology, based on the needs of our country.

In order to establish the above-mentioned agreement between the two academies, I was invited to travel to Moscow. Keldysh met our delegation and seated me in his own car. As we traveled through Moscow, he pointed out a place called Nikitin Gate near Arbat Street. "This is where I grew up and studied," he told me, and he talked about his early life with great enthusiasm. As Keldysh was an outstanding scholar in the fields of physics, mathematics, and technology, he enjoyed talking about these subjects.

Since there was a vast scope for research in these subjects, he said that it was possible for any country to carry out some kind of research. He advised me on the appropriate areas to study, and said that they would be able to help train skilled staff for our academy.

The Presidium of the USSR Academy of Sciences had set out a program of visits for our delegation. We visited several of the Soviet Academy's research establishments, in particular the institutes where scholars were conducting research in physics and mathematics laboratories. These included the many branch institutes of the Academy of Sciences in Novosibirsk, where we met with the staff.

As a result of Keldysh's initiatives, several institutes of the USSR Academy of Sciences which were doing research in physics, mathematics, and technology would train specialists in mathematics and physics for our academy from the time the agreement was made until 1982.

After meeting with the deputy presidents of the USSR Academy of Sciences, the technology scholar V. A. Kotelnikov, the physicist M. D. Millionshikov, and the nuclear physicist Academician A. A. Logunov, we visited the Siberian branch of the USSR Academy of Sciences where we had a working meeting with a vice-president of the USSR Academy of Sciences, Academician S. T. Belyaev. When I asked them for advice, in addition to discussing Keldysh's ideas, they gave me their own valuable advice.

Whenever I went [to Moscow] on behalf of the academies of the two countries, or to attend an international research meeting, Keldysh would always try to meet me in person, or if he was unable to do so, would beg to be forgiven and would invite me to the Blue Room of the Praga Restaurant where we would have lunch together and talk about old times. Because he was a punctual person, whenever we met over lunch, his close friends used to say that it was because we had always arranged to do it that way. These people were the same age as myself and were very friendly towards me.

Keldysh was a short, slightly built man with a weak voice. He used to look straight up at people when talking to them. He sent me a greeting card on my sixtieth birthday containing a beautiful message which I have carefully preserved.

He had become acquainted with the natural environment of Mongolia, its climate, history, customs, recent scientific advances and, in particular, with the nature of the research work being carried out there. He told us about the experience of the Academies of Sciences in Uzbekistan, Tadjikistan, and Kirgizia, and about the proper way to manage the branch units of the Academy of Sciences in the autonomous republics.

Although Keldysh was a quiet man, he liked to engage in informal conversations and enjoyed humor and jokes. Whenever we invited him to our country he accepted the invitation with pleasure, and regardless of the season used to inquire about the nice things he had seen, and asked if he could set up a tent and spend a night or two in a tent breathing in our fresh, natural air

Included among his many scholarly subordinates was A. I. Lavrent'ev, whom we met when we visited the Siberian branch of the USSR Academy of Sciences. Lavrent'ev invited us to his own tiny, two-story house. He was a tall man with quick movements, who made an effort to focus on major theoretical and practical problems. Since he was training skilled personnel in foundation courses, he created an initiative at the university in Novosibirsk whereby he selected workers' and farmers' children to be brought in for training. He himself taught some of the lessons. He asked some of his subordinates to teach some classes too, and to do some coaching. He had a genuine passion for science, and through his activities became an experienced trainer of skilled personnel.

During the implementation of the above-mentioned agreement, the joint activities of the two academies were based on two-year plans until 1972, a three-year plan during 1973-1976 and a five-year plan from 1976 onwards. From 1967 until the present day, the research organizations of the two academies have had an equal right to exchange research workers, and they did so every year. In this way, research was conducted in areas of mutual interest and there were good opportunities to become familiar with expertise in research, publication, and the basic requirements for research work. One of the traditional forms of cooperation between the two academies involved the joint organization of scientific expeditions in Mongolia. These included:

(1) A joint Mongolian-Soviet geological expedition led by the USSR State Award holder A. A. Yashin (a foreign member of the Mongolian Academy of Sciences), who was awarded the order of the Red Flag of Labor of the MPR, the Soviet scholar and geologist N.S. Zaitsev, and our corresponding member of the Academy of Science, Dr. B. Luvsandanzan.

(2) An historical/cultural expedition carried out from 1967 onwards and led by Academician and Hero of Socialist Labor A. P. Okladnikov, holder of a Soviet State Award and holder of the Altan Gadas medal of the MPR, along with Sh.Natsagdorj and myself. He too was a foreign member of the Mongolian Academy of Sciences.

(3) A joint Mongolian-Soviet biology expedition led by USSR Academician Ye. M. Lavrenko, holder of the Mongolian Altan Gadas medal, the present USSR Academician V. E. Sokolov, the corresponding member of the Academy of Sciences Ts. Davajamts, and the director of the Institute of General and Experimental Biology of the Academy of Sciences, O. Shagdarsüren.<sup>10</sup>

(4) Mongolian-Soviet paleontological expeditions conducted from 1969 onwards, and led by the corresponding member of the USSR Academy of Sciences A. G. Vologdin, the corresponding member P. P. Tatarinov, and our doctor of geological sciences R. Barsbold.

The joint geological expedition carried out much work on the history of surface formations, a study of the spatial distribution of resources in the country, and clarification of the issues involved in the mining of useful minerals. The main results of the research of this expedition were published in Russian in thirty volumes with four maps of the country.

Particularly important works were *BNMAU-yn gazryn stratigrafi ba tektonik* [Stratigraphy and Tectonics of the MPR] (1970), *Kainozoi ba mezozoin üeiin Baruun mongolyn geologi* [Cenozoic and Mesozoic Geology of Western Mongolia] (1970), *Mongol orny khovor metallын granitoid* [Rare metals and granitoids of Mongolia] (1971), *Onolyn болон бүсийн тектоникийн асуудлууд* [Problems of Theoretical and Plate Tectonics] (1971), *Khövsgöliin fosforyн sav gazar* [The Khövsgöl Phosphorite Deposit] (1973), *BNMAU-yn galt uulyn garaltai khüdrin negdel, tüünii бүтэц, stratigrafiin байдл* [The Classification of Volcanically-produced Ore in the MPR and its Formation and Stratigraphy] (1973), *BNMAU-yn nutag devсgeriin tektonik* [Tectonics in the Territory of the MPR] (1974), *Mongolyn mezozoin ba kainozoin üeiin tektonik ba soronzonchilol* [Tectonics and Magnetism of the Mesozoic and Cenozoic Period in Mongolia] (1975), *Mongolyn karbon, permiin paleontologiin үндэслэл* [The Paleontological Basis of the Carboniferous and Permian Periods in Mongolia] (1976), *Baruun болон khoit Mongolyn gazрын бүтэц dekh borzhinlog ба khüchilleg khevshil* [The Structure of Granite and Acidic Formations in Western and Northern Mongolia] (1975), and *Mongolyn Kainozoin üeiin litologi* [Lithology of the Cenozoic Period in Mongolia] (1977).

In addition, it should be mentioned that some reports and accounts focused on practical ideas and discoveries.

The joint paleontological expedition carried out studies on the marine creatures of the Paleozoic era, the land animals and fresh water creatures of the Mesozoic and Cenozoic eras. The discovery of large graveyards of dinosaurs, mammals, and other animals has been of great significance for world science. The report and initial conclusions on the research work of the joint paleontological expedition were published and ran to seven volumes. These works included *Am'tny aimag ba biostratigrafi* [The Classification of Animals and Biostratigraphy] (1971), *Mongolyn mezozoi, kainozoin am'tan, urgamal, biostratigrafi* [Animals, Plants, and the Biostratigraphy of the Mesozoic and Cenozoic Eras in Mongolia] (1976), and *Baruun Mongolyn neogeny khirsiin зарим бүлгийн тухай* [Concerning Certain Families of Rhinoceros of Western Mongolia] (1971).

<sup>10</sup> Shagdarsüren is widely known as the chief editor of Mongolia's first systematic attempt to catalog the country's endangered plants and animals, *Biigд Nairamdakh Mongol Ard Uls, ulaan nom* (Ulaanbaatar: Ulsyn Khevelelin Gazar, 1987). The results of this expedition were published in *Rastitel'nyi i zhivotnyi mir Mongolii/Mongol orny urgamal ба ам'tny aimag* (Leningrad: Nauka, Leningradskoye otd-e, 1977).

The joint biology expedition which was studying climatic conditions and many important questions relating to natural resources revealed the results of its research in a nineteen-volume publication. These included the five-volume *BNMAU-yn shav'zh* [Insects of the MPR] (1971-1977), *BNMAU-yn khoit govin tsöl tal* [Deserts and Plains of the Northern Gobi of the MPR] (1974), and *BNMAU-yn oi* [Forests of the MPR] (1978). This expedition also produced and published maps of the vegetation and soil of Mongolia.

The joint expedition on history and culture carried out many aspects of the study of the Old and New Stone Age, and the Bronze Age and Iron Age on the territory of Mongolia. In 1978, Academician A.P. Okladnikov edited the single-subject publication entitled *Arkheologiya i etnografiya Mongolii* [Mongolian Archeology and Ethnography].<sup>11</sup> Some of the other Mongolian and Soviet scholars of the expedition also wrote books and other publications.

The exchange of academic representatives between the two academies was especially significant for the far-reaching foundation courses of our academy, the planning and selection of critical decisions, and therefore the introduction into industry of scientific leadership and gains, and the training of skilled personnel to do this. In 1979, for example, each institute within our academy had links with between three and fifteen institutes of the USSR Academy of Sciences. This was a clear demonstration of the cooperation between the two academies. Over the course of twenty years 600 workers in the academy had done research at organizations of the USSR Academy of Sciences. Five hundred and twenty-three had achieved the degree of candidate scholar at the Soviet Academy of Sciences or other Soviet universities and colleges. Fifty-eight people successfully defended their doctorates at these institutions.

We also carried out joint activities with the academies of several of the other fraternal socialist countries. Agreements were signed on joint research projects with the academies of East Germany and Cuba in 1963, with the Bulgarian and Hungarian academies in 1966, with the Czechoslovak National Academy of Sciences in 1969, and with the Polish Academy of Sciences in 1973. There was also an exchange of scholars with these academies.

We exchanged ideas with many of their members, including the philosopher Tadeus Kotarbinski and the presidents Groshkovski and V. Tshebyatovski who succeeded him, the academic secretaries Genrik Yablonski, a foreign member of our academy, and Jan Kachmarik, the economist Tsesomski, the sociologist Jan Shepanynski, the president of the Bulgarian Academy of Sciences Angel Balevskii, the president of the East German Academy of Sciences Hermann Klahr, another foreign member of our Academy of Sciences and its academic secretary K. Grötze, the president of the Hungarian Academy of Sciences, the medical scholar I. Rusnyak, the Mongolist and foreign member of our academy Lajos Ligeti, the nuclear physicist and foreign member of our academy Lajos Janosi, the president of the Czechoslovak Academy of Sciences and foreign member of our academy, Ya. Kozheshnik, and the former vice-president Rositskii.

Our acquaintance with the activities of some of the institutes of the above-mentioned academies proved useful in our work. We visited famous and historical places in the above countries, including the so-called Zwinger Palace art gallery in Dresden

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<sup>11</sup> Published in Novosibirsk by the Siberian branch of Nauka.

where we viewed some interesting works by famous painters of many different eras as well as various objects made of porcelain and metal. We visited the tiny two-story summer house near Berlin where we gained important knowledge about the famous physicist Albert Einstein, who lived there in 1929. We also went to see the interesting documents which were kept in the museum where the Potsdam Agreement was signed at a meeting of the Soviet Union, United States, England, and France.

The Academies of Science of Bulgaria, Hungary, East Germany, Poland, Czechoslovakia and Cuba, and the Committee on Social Sciences and the Science Center of Vietnam carried out joint activities with our academy, the main ones being agreements to exchange scholars, the carrying out of joint research in areas of mutual interest, the reciprocal invitation of representatives to take part in scientific activities, the publication of research and different ways of exchanging other kinds of material.

Mongolian scholars were also elected as foreign members of the USSR Academy of Sciences and some of the scientific organizations of other foreign countries. I was elected a foreign member of the Hungarian Academy of Sciences in 1964, of the USSR Academy of Sciences in 1966 and of the Czechoslovak Academy of Sciences in 1973. I was also awarded honorary doctorates by foreign universities: in 1974 in East Germany, in 1976 in Bulgaria, in 1974 in Poland and in 1970 at the University of Leeds in England where I was awarded an honorary doctorate in literature.

I visited England in May 1970 to attend a degree-awarding ceremony at the invitation of Leeds University. While in London, we visited Westminster Abbey, St. Paul's Cathedral, the British Museum, the Victoria and Albert Museum, the Houses of Parliament and some monuments. Accompanied by Professor Lattimore, we left London by car to travel to Cambridge. There were about 9,000 students in the twenty-eight colleges of Cambridge University, which was one of the original English universities, having been founded some seven hundred years previously. There were about 450 overseas students studying there. We also met with E. H. Carr, professor of history at this college. He had been studying the political life of the Soviet Union for some thirty years.

We also paid a visit to Oxford University. There were also twenty-eight colleges there including five colleges for women. The university, like others in England, owned many churches and jealously guarded its old traditions. Old paintings, portraits, tables, chairs and so forth were held in high esteem. This university had a famous press which printed its first book in 1478.

Stratford-on-Avon was the town where William Shakespeare (1564-1616) lived and died, and is an international center for Shakespearean studies. Its theaters and museums attract much interest from tourists. The Shakespeare Society, which was established in 1874, preserved the writer's heritage and has worked continuously to foster museums and exhibitions.

On the four-hundredth anniversary (1964) of Shakespeare's birth, the society established the Shakespeare Center. This building is located in the courtyard of the house where Shakespeare was born. The center is now in charge of the work of studying, promoting, and developing Shakespeare's works, organizing an annual festival of his plays, celebrating his birthday, sending the players on foreign tours, receiving guests, and so forth. When we looked at the register of visitors to Shakespeare's house/museum, we saw that two people from Mongolia had already been there. While we were in Stratford-on-Avon, we were taken to see the play "Richard the Third" in the Shakespeare Theater. Every year people came from as far away as London to see Shakespeare's plays.

During the preceding six years, the number of students at Leeds University had grown by fifty per cent to eight thousand, fourteen per cent of whom were women. There were 1200 academic staff, and the university had seven faculties and seventy departments which taught ninety-nine courses. There were over eight hundred overseas students from ninety one countries making up nearly a tenth of all the students. Leeds had been a university of international standing for sixty-six years.

On May 14, 1970, the highest authority of the university, known as the University Court, confirmed the decision to confer an honorary doctorate on me. When this was done, the university published a report about this decision which included a short biography of me. According to the program of the ceremony, at 4 p.m. on Wednesday, May 20, 1970, nine foreign and British people were to be awarded degrees in the Great Hall of the University. This particular ceremony for conferring honorary degrees was held once a year in addition to the graduation ceremony.

Those who took part in the ceremony included the university's masters of ceremonies, members of the university assembly, past and present members of the university's administration, professors, honorary graduates, the university council, court members, church representatives, city leaders, the reporting professors for the honorary graduates, the president of the university council, the chancellor and vice-chancellor. All the people who were wearing mantles bearing a coat of arms and decorated with pendants and ribbons slowly filed through the middle of the hall in a set order while organ music played, walked past the seated audience and guests and mounted the stage, where they took up their positions.

Vice-Chancellor Colonel J. H. Kitson opened the ceremony. He summoned the honorary degree candidates one at a time, greeting each on the stage, and introduced him to the chancellor by reading him a short biography of the candidate. I was introduced by Professor O. Lattimore in this ceremony, which was a pleasant affair.

In his introductory report, Prof. O. Lattimore mentioned the successes our country had achieved in culture and science as a result of the Mongolian People's Revolution and noted that "Shirendev was one of the intellectuals who appeared following the revolution." He read a brief biography and told the audience about Shirendev's contribution to the development of cultural relations between Leeds and Mongolia. At this point, the audience applauded loudly.

Other people present at the ceremony included our ambassador, S. Dambadarjaa, Academician Sh. Luvsanvandan who was teaching at Leeds, and E. Puntsag who was a researcher in the department of Far Eastern Studies in the Academy of Sciences. Those who received honorary degrees in the ceremony were loaned a special gown and hat by the university, and although these outfits were usually taken back after having been used for the ceremony, mine were presented to me to keep as a souvenir. They said that they would send the degree certificates later. After the ceremony, a banquet was held at which Ambassador Dambadarjaa and the Mongolists Lattimore and Urgunge (Onon) were present.

On my return to London, I was met at the railway station by representatives of the British Council who took us to the Park Lane Hotel in Piccadilly. We went to meet the vice-chancellor of London University, Sir Brian Windeyer. The vice-chancellor told me that there were 36,000 regular students at the University of London and 35,000 students taking correspondence courses. The regular students studied for three years if they were in the Faculty of Social Sciences; the correspondence course students spent four

years and medical students studied for five or six years.

Our program included a visit to the British Academy on May 21, where D. F. Allen, the secretary of the academy, greeted us at a cordial reception and told us about the work of the academy. Its fourteen departments included Ancient History, Medieval History, Modern History, Theology, Far Eastern and African Studies, Classical Literature, Philosophy, Law, Economics, Economic History, Archeology, History of Art, and Social and Political Science. The Royal Society was one of the academy's responsible bodies which carried out research into natural sciences.

At the end of our visit Lord Fulton, the chairman of the British Council, organized a reception in our honor. In total, over sixty people were invited to the reception, including our ambassador and the staff of the Mongolian embassy, senior officials from the British Foreign Office, the British Academy, the British Museum, the Anglo-Mongolian Society, the Asia and Central Asian Society, various professors, and some Mongolist scholars.

Professor Lattimore made a speech there, saying

I have had links with Mongolia for forty years. I was born in America. However the twenty years or so that I have spent in my own country amount to only half the time I have spent on Mongolian studies. My wife is dead now but I will not sit by idly. I think I will be able to work for another ten years or so. I will write about and compare the history of old Mongolia with the new Mongolia."

Ivor Montagu had written three volumes of recollections about his work and life. He presented me with a souvenir copy of the first volume which contained accounts of his early life until the time of his marriage. A person named Wolff came to meet us. Mr. Serge Wolff had been working with some Mongolian students in Berlin in the 1920s. He had written an account of some recollections entitled "The Mongolians who Pursued an Education in Western Europe, 1926-1929."<sup>12</sup> There was a Mr. Wood [?] who was the deputy editor of the English journal *Nature*. With the support of the British Council he had requested a meeting with me. He wished to learn about the development of natural sciences in Mongolia and the growth of research work there. I replied to his interesting questions and gave him a clear description of science in Mongolia and the role of the Academy of Sciences.

In 1967 Academician Ts. Toivgoos was elected a regular member of the All-Union Lenin Agricultural Academy, and in 1970 Academician B. Rinchen was elected an honorary member of the Hungarian Academy of Sciences. Our research organizations and scholars were members of world-wide organizations such as the Permanent Committee of Mongolian Scholars, the International Commission for the Study of Central Asian Culture and Civilization, the International Association of Social Studies and Sociology, and the International Association of Philosophers.

In the field of Mongolian Studies, scholars such as the American Mongolists O. Lattimore and Khanginy Gombojav,<sup>13</sup> the scholar from England Urgunge Onon, the West

<sup>12</sup> The actual title is "Mongol delegations in Western Europe, 1925-1929," *Journal of the Royal Central Asian Society* 32 (1945), 289-298; 33 (1946), 75-93. See also "Mongolian educational venture in Western Europe (1926-1929)," *Mongolia Society Bulletin* 9:2 (1970), 40-100. With some additions, also in *Zentralasiatische Studien* 5 (1971), 247-320.

<sup>13</sup> Known in the West as John Gombojab Hangin (1921-1989), who for many years taught at Indiana University and founded the Mongolia Society of the United States.

German Mongolist Walther Heissig, the Japanese Mongolists Shirō Hattori, Iwamura, Shigeo Ozawa, and Abematsu repeatedly visited our country to take part in congresses and conferences of Mongolists, and meetings on Central Asian affairs and on the non-capitalist development of Mongolia. They exchanged ideas and information with us on Mongolian studies which assisted our historical and linguistic research.

The Party and government leaders of the day began to blame us for copying the work done in foreign countries. We repeatedly explained that since every country had studied its own history, language, literature, politics, and philosophy, all of us would have to use the same terminology for these subjects. We also had to study the characteristics of the research of these countries, since without possessing the scholars and institutions which used the universal theories and techniques of mathematics, physics, technology, geology, biology, and plant science, how could anyone possibly match the development of these particular countries? The critically important questions in research, including the terminology of subjects, had already been decided by the research organizations of these other countries, and consequently the names of the subjects are identical.

When choosing the direction academic studies should follow, it was felt that attention needed to be paid to the most critical long-term questions and topics at a particular time in the course of history, and to the wider aspects of natural, social, and technical sciences. While planning research work, it was crucial to pay attention to the prime demands of social and economic development, the proposed aims, the experience of other countries in planning research work, and the general trend of scientific and technical advances. Looking once again at an overview of the transformed organization, it was quite correct that our social scientists paid attention to observing and correcting the routine use of dogma.

Along with some Soviet scholars, our geologists had established several characteristics of the geological structure of the country and studied the principles of the location and development of all kinds of useful minerals and ores on the Central Asian plateau in the territory of Mongolia. Mongolia's tectonic and geological charts and ore strata were studied and charts showing predictive models were constructed and published. Also worth mentioning is the first national atlas of Mongolia, which appeared towards the end of 1980, having taken many years to compile.<sup>14</sup> I met many times with the Soviet scholar A. Vinogradov and the academicians D. I. Shcherbakov, A. V. Sidorenko, A. L. Yashin, Kuznetsov, I. V. Luchitskii, A. A. Trofimuk and A. G. Vologdin. I listened to their relevant reports on and explanations of research in geology in Mongolia.

Following the above lines of research, our scholars relied on the methodology and experience of the scholars of the Soviet Union and other friendly countries. This work was carried out on a wide scale, and its subsequent publication was their contribution to the knowledge of our motherland. The research work done by our scholars between 1961 and 1980 led to the publication in 1981 of *BNMAU-yn Shinjlekh Ukhaany Akademiin товч түүх* [A Short History of the Academy of Sciences of the MPR].<sup>15</sup> As all relevant details can be found in this book, I will not repeat them here.

The infinite material universe and its endless potential development mean that,

<sup>14</sup> *Bügd Nairamdakh Mongol Ard Ulsyn үндэсний атлас*. Ulaanbaatar, 1980.

<sup>15</sup> This book, written by Shirendev, was actually published in 1980, while its Russian version, *Kratkii ocherk istorii Akademii nauk Mongol'skoi Narodnoi Respubliki*, was published the following year, both in Ulaanbaatar.

at any one time, no inquiry, compilation or conclusion can be perfect. Only genuine achievements will continue to be handed down as being useful to successive generations of researchers. The tentative ideas and conclusions made during the above projects were cast aside when more advanced research allowed more far-reaching conclusions to become possible.

Brand-new paths of research were established within the system of the Academy of Sciences. In particular, the Department of Sociology was permeated by the methodology used in economics, mathematics, and sociology. In addition to the growth of research methods useful in Far Eastern studies, law, development of the industrial work force, architecture, science and information services and scientific logic, an initiative was also undertaken to produce a Mongolian national encyclopedia. The proposed contents of the several volumes of that encyclopedia were set forth in detail to reflect the aim of attracting a wide readership. However, progress in actually producing the work has been slow. Only one volume, a dictionary, has been prepared for publication.

Many new branches of science emerged in our country, including space research, genetic theory, electronics, solid-state physics, the use of computers in research, the manufacturing of research tools and equipment, the utilization of solar energy and energy from hot springs, microbiology, soil science, thermodynamics, research into radioactive particles, geochemistry, biochemistry, physics, and biophysical techniques.

Following the establishment of the Academy of Sciences, letters were received from foreign scholars and ordinary citizens with all kinds of suggestions. Information arrived from Gobi-Altai stating that the takh'<sup>16</sup> was now extinct in our country. We sent people on a number of occasions to investigate whether this was in fact the case. Some claimed to have seen not more than one or two of these horses while others said that there were no takhi at all. As a result of this, we planned to obtain a few takhi foals from Czechoslovakia for re-introduction into Mongolia.

The Institute of Biology was established with the main aim of carrying out research in microbiology. The Institute of Physics and Technology led the introduction of computers and electronics into research work. Based on this research, the MONEL Company began to manufacture two thousand color television sets every year.

It was right that in establishing our model for future work, basic research development should take priority over technical development and supplementary research., [Any] such planning would need to take account of exploiting the rich mineral and fuel reserves of the country while simultaneously protecting the natural environment. All the problems associated with the appropriate development of the nation's labor force were considered and resolved.

We also tried to coordinate the research activities of the Academy of Sciences with the research work being carried out by the university, colleges, and branch institutes. The Mongolian State University actively took part with the academy in research projects in chemistry, physics, biology, botany, philosophy, economics, and law and rights. Other colleges and branch institutes also took part in their own specialist fields of research work.

In 1962 a coordinating council was established for the Academy of Sciences. In 1966 the Institute of Scientific History, which was transferred to the control of the

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<sup>16</sup> The takh' or taki is best known in the West as Przewalski's horse (*Equus przewalskii*). This small but robust horse is native to East Central Asia and is named after N.M. Przevalskii (1839-1888) who discovered it.

Council of Ministers, produced a long-term program on the key problems of the development of technology. Although it had focused on the above-mentioned program of objectives, on the Five-Year research plan and on the plan to introduce research findings into industry, its organizational methods were poor and its resulting failure was regrettable.

When the Soviet cosmonaut G. Titov visited our country I wrote a poem, part of which went as follows:

Well, will you tell us about the interesting things you have seen  
 along the way?  
 Will you tell us about your journey?  
 What are the unusual things in the universe?  
 What interesting knowledge has been gained?  
 Flying far away to these places, on your way to the sky,  
 what deserves special attention?  
 The space which you have flown through again  
 What use can it be put to in our lives?

At the invitation of the Soviet government, a conference was held in Moscow on November 15-20, 1965 on the peaceful utilization of space research. It was attended by the delegations of socialist countries, including Bulgaria, Hungary, East Germany, Cuba, Mongolia, Romania, the Soviet Union, and Czechoslovakia. The president of the USSR Academy of Sciences, Academician M. V. Keldysh, read a report on the main subject of the conference. Reports were also read by the director of the USSR Meteorological Office, Academician Ye.K. Fedorov, on the climate of the atmosphere and by the USSR Minister of Communications, N. D. Pisurtsev, on communications in space, and by the director of the Headquarters of the USSR Department of Health, V. N. Pravetskii, on space medicine and technology.

On November 18, our delegation met with the Soviet cosmonauts A. Nikolaev, P. Popovich, and A. Leonov at the Mongolian embassy in the Soviet Union. At this meeting, the cosmonauts gave a detailed description of space research and their own experiences. It was noted that Mongolia had participated in the initial work of processing the necessary food and provisions (dried meat etc.) that the cosmonauts required during their preparation for space and during the space flight itself. It was considered important that the representatives of all the national bodies should participate in coordinating and controlling organizations for the joint utilization of space research. Within two to three months, these organizations had absorbed the ideas of each country and the conference had agreed on several occasions to discuss the details of every question based on the national reports of the participant countries.

Following a resolution of the Council of Ministers on March 4, 1966, the Council for the Peaceful Utilization of Space Research was established alongside the Academy of Sciences. I was appointed its chairman. In April 1967 a gathering of delegations from the socialist countries was held in Moscow and the Intercosmos program was confirmed.

I led a Mongolian delegation to a UN. meeting on the peaceful utilization of space research held on August 14-27, 1968. The delegation included the Deputy Minister of Communications D. Garam-Ochir, the deputy director of the leading official meteorology center B. Myagmarjav, and an official from the Foreign Ministry Z. Rendoo.

On July 13, 1976 I signed an agreement between the Mongolian and Soviet governments on space flights by citizens of the socialist countries, and in 1977 preparations began for a space flight by one of our citizens. Personnel trained in space science were sent to study in the Soviet Union. A space research section was established in the Academy of Sciences and further work was carried out to select people for the space flight.

While these trained personnel were being prepared for the space research flight, the selection and training of our people and our participation in international space research was greatly assisted by the USSR Academy of Sciences and in particular by the chairman of the Interkosmos project, Academician R. Z. Sagdeev, the Vice-president of the USSR Academy of Sciences A. V. Sidorenko, the director of the Institute of Space Medicine O. G. Gazenko, Academician A. L. Yashin and the leadership of the Space City, in particular Air Force Lieutenant-General G. Beregevoinar.

As the time approached to prepare our people for the space flight, in July 1977 Academician B. N. Petrov visited our country for a vacation, during which he helped us greatly in our work. The chairman of the Council of Ministers J. Batmönkh and S. Jalan-Aajav, the secretary of the MPRP Central Committee, hosted a reception and had talks with academician Petrov which were highly significant for the preparations. Prior to Petrov's visit, A. Nikolaev, V. V. Tereshkova and V. V. Gorbatko visited our country and met with us at the offices of the Presidium of the Academy, where they gave us important advice. Following the Vienna conference, all the working relationships were agreed to with Academician B. N. Petrov, with whom we met several times.

Petrov died in 1980, which was a great loss to the Soviet Union, the socialist countries, and world science. When confronted with this regrettable event, I was full of sorrow and attended his funeral. The publicity and organization for putting one of our people into space was led by the MPRP Central Committee. The Central Committee established a special commission, initially chaired by Secretary Jalan-Aajav, who was succeeded by G. Ad'yaa. The commission included myself and B. Chadraa from the Academy of Sciences, J. Avkhai, who was Minister for the Protection of the Environment, and B. Dejid, Minister of Public Security. Why Dejid was included I do not know.

Soviet scholars had carried out much work in their efforts to conquer space and had made many new discoveries. The glorious son of the Soviet Union, Yu. Gagarin, opened the way for man to fly in space. Since then, many dozens of Soviet people have flown in space and people have flown to the moon. Soviet expenditure and finance were not only intended to satisfy the wishes of our country and the other nine countries to go into space, but also to do research into what was important in our lives in the unexplored vastness of space, to introduce useful things for the people of our world and for the national economy. The study of the many detailed technical requirements of the useful minerals on our planet, and studies of the climate, soil, water and vegetation could be carried out better from space than on the ground.

We selected J. Gurrachaa and M. Ganzorig (Gankhuyag being an embarrassing word in Russian, his name was changed to Ganzorig) from a large number of applicants. They undertook over two years of training at Moscow's Space City in spacecraft technology and equipment, zero-gravity conditions, spacecraft operation, trouble-shooting, intelligent overcoming of probable difficulties, flying the craft and parachuting from it. In addition to training for a landing at sea, we had prepared over thirty of our own research programs, which they were taught to carry out.

Two weeks before take-off they went to Baikonur to make their pre-flight preparations. A Mongolian delegation led by J. Batmönkh traveled to Baikonur on March 22, 1981, and I also took part in a meeting with the cosmonauts. However, we could only communicate with them through a glass window with microphones and loudspeakers on either side of it. The delegation went to the space technology center and to the station which had prepared the space flight to learn about the systems and equipment of the other spacecraft. Each item of equipment on the craft and station consisted of a large number of gear wheels, mechanisms, nuts and bolts, and wires which made it almost seem like a living creature.

At the appointed time, the bus carrying the two cosmonauts arrived at the launch pad. The two cosmonauts were among the main group which emerged from the first bus. They were wearing the white suits which would be worn during the take-off and landing. At other times they wore ordinary clothing. This specialized clothing contained radio, telephone and signaling equipment and a powered breathing apparatus. Among the second group of people were two men who were wearing ordinary, military uniforms.

After the flight crew had given their report, the leading group of two crew members had their photographs taken with our delegation. The spacecraft Soyuz-39 was ready on the launch pad, attached to its rockets. Each rocket produced twenty million horse-power. Once the cosmonauts had entered the spacecraft, they connected all the systems of the spacecraft and linked some three thousand instruments and switches which monitored the spacecraft's steering mechanism, electricity supply, radio, television, temperature, automatic controls, air, and living environment. These were all specially numbered. All those instruments and mechanisms were repeatedly monitored by many systems in the launch station and at the Moscow center. This work took nearly three hours to complete.

At about 5 p.m. Moscow time, we were 1800 meters away from the launch site. At that moment V. Zhanibekov and J. Gurrachaa reported from the Soyuz-39 craft before take-off. When the command was given, flames appeared from below the rockets and a thunderous noise was heard. Five supports fell away from the spacecraft in different directions. The spacecraft consisted of three parts along with its rockets. It gradually began to pull away from the launch pad and, in the blink of an eye, gathered speed.

Five hundred and twenty-nine seconds later it had entered space. One hundred and eighteen seconds later, at a height of forty-five kilometers, the first stage of the rocket was released. The second stage broke away four hundred and thirty kilometers from the launch pad, and at four hundred and ninety one kilometers, the third stage began to work. Basically, within nine minutes, the spacecraft had begun its space flight. At this moment, all the Soviet and Mongolian colleagues who were watching from the observation area congratulated each other. The three-stage spacecraft, which could travel around the world in ninety minutes had been connected to the launch platform with four hundred interlocking "teeth."

The cosmonauts V. Kovalënok, V. Savynykh, V. Zhanibekov, and J. Gurrachaa had been working feverishly aboard Salyut-6 and Soyuz-39. They knew everything on board the spacecraft and gave interviews with journalists. They also conducted over twenty studies in physics, technology, geology, biology, and medicine. They were also to observe the phosphorite deposit at Khövsgöl, the Tavan Tolgoi coal deposit [in the Gobi], pasture, water supplies and rivers, and valuable resources below the surface. The vessel orbited over the city of Ulaanbaatar at 8 pm on March 28.

Fourteen assignments were carried out, including the physical, technical, and technological study of some nuclear high-energy solar particles from space, the Tuya experiment, which studied the physical changes in the bodies of the cosmonauts, and the Polyarizatsi experiment, which measured to what extent sunlight was reflected from the atmosphere and to what extent it penetrated to earth and was transformed into heat.

In order to study the use of materials in space, all kinds of substances were melted, dissolved, and grown in the twelve Pristall experiments, the Erdem study of natural resources and the Biosfer-Mon study of the formations on the surface of earth which could be measured with instruments. The studies carried out included the Chatsargana (Sea Buckthorn) study, which examined how the cosmonauts were affected by the Chatsargana-enriched food during the flight, the study of the deterioration of physiological processes under conditions of weightlessness, the Biorhythm study into the influence of changing time patterns, the Time Period study and others.

While these programs were being devised, B. Chadraa, who was secretary of the commission and vice-president of the Academy of Sciences, carried out all the work of the commission on his own. The subjects studied in space followed the Interkosmos program and were useful for the production of geological and geographical maps, for the prospecting for useful and valuable mineral deposits, and the study of vegetation. The pictures taken from space have been very helpful in prospecting for oil and other raw materials, and for archeological expeditions.

Telegrams were received from Academician A. P. Aleksandrov, president of the USSR Academy of Sciences, and from the vice-president and chairman of the Interkosmos space project, Academician V. N. Kotelnikov, who warmly congratulated the Mongolian-Soviet space crew on board the Soyuz-39 spacecraft, and the Mongolian specialists for their jointly-designed flight plans in the Salyut-6 and Soyuz installations. The Soyuz-39 spacecraft was piloted by the Soviet commander, cosmonaut Vladimir Zhanibekov, and the Mongolian citizen, research cosmonaut, Jügendermidiin Gurragchaa who completed all the planned research work and experiments of the joint Soviet-Mongolian space program and returned to earth on March 30. In conjunction with this amazing event of huge international significance, Soviet scholars, designers, engineers, technicians and space researchers sent warm congratulations to our country's scholars.

When Comrades Gurragchaa and Zhanibekov arrived back in Moscow, they were received by a joyous Moscow public and by Leonid Brezhnev, the General Secretary of the USSR Communist Party and chairman of the Presidium of the Supreme Soviet. The title Hero of the USSR and the Order of Lenin were conferred on them in a presentation which was transmitted on television around the world. When Zhanibekov and Gurragchaa arrived in Ulaanbaatar, they were received warmly and cordially by the Mongolian people. All the members of our space commission took part in several meetings, and their speeches appeared in the press. Gurragchaa and Zhanibekov were received and congratulated by Tsedenbal, who presented each of them with the order of Hero of the MPR and the Sükhbaatar medal.

The almas has been called the "antelope man" by our people. In other countries it has been called the "abominable snowman," about which many things have been written. Many expeditions to find it have been made by the scholars of many countries. There have been fierce arguments about it and continual claims of proof that the almas does exist have been followed by silence. However, towards the end of the 1950s a clamor of

interest arose again, and Soviet and American scholars began the process of studying it.

Professor B. Porshnev, a Soviet scholar and an expert in ancient and medieval history, suggested to the Presidium of the Soviet Academy of Sciences that research and expedition work should be actively carried out. When this question was discussed, biologists and archeologists argued among themselves whether such an animal could exist. Porshnev said, "Science cannot solve this question by argument, only by evidence!" No one was able to refute this. A commission which included various experts was established by the Presidium of the Academy.

This commission, headed by Porshnev, went out into the Soviet Altai, Siberia, and the Caucasus to gather local tales and legends. They also established links with American scholars, with whom they exchanged material. American scholars had written about repeated sightings in their own country of a bulky, hairy and large-footed animal. Copies were made of the footprints made in snow and mud, and these were published in newspapers and journals. The animal was known as "Big Foot."

Porshnev had the courage to turn to the research organizations of certain countries in Central Asia, including our own academy, and a letter from him arrived addressed to me. In the letter (which I have kept), he asked, "Because your country is one of the legendary habitats of the almas, will you help us by taking an active part in its study?" Before replying to that letter, I met with our leader Tsedenbal and explained the reasons why we should organize an expedition.

Tsedenbal said "there is no point in organizing such an expedition, is there? We should instead be carrying out research into things which would be of practical help in our lives." I wrote a letter to Porshnev saying, "I have received your request and I wish to correspond with you on this matter. However, it would be better if you send a copy of your letter through our embassy and addressed to Comrade Tsedenbal."

A few months later, Tsedenbal suddenly summoned me to his office saying that he had received a letter from the Soviet scholar Porshnev. He showed it to me and asked, "What do you think about this?" I replied that there were many legends about the almas in our country and that I believed we should send some people to find out about it. Tsedenbal agreed saying, "In that case, you may organize an expedition to go with him in connection with this matter."

J. Damdin, nicknamed "Cannon" Damdin, and the biology lecturer R. Ravjir were appointed to travel to Bulgan sum on the boundary between the aimags of Bayan Ölgii and Khovd, and to certain places in Gobi-Altai aimag on a number of occasions. Damdin spent a few months sleeping in mountainous and rocky places. Ravjir spent a whole year there, living all through the winter and summer. As they conducted searches, they gathered a considerable number of legends and information about the occasional sightings of the almas creature.

This material ought to be in the archives of the Academy of Sciences. When I discussed the matter with B. Rinchen he was very interested in the original question and once traveled to the place where Damdin and Ravjir were conducting their search. On meeting with them he gave them much advice based on his own thoughts and ideas. While Rinchen was doing that, he obtained from Ravjir and the others a human skull bearing some whitened hair and returned with it to Ulaanbaatar. According to him, the thing might have been the skull and hair of an almas. It was sent to a research laboratory in Poland. We received a reply from the Soviets saying that it was not an almas and from the Polish side saying that it was.

Once, during a seminar given in Ulaanbaatar by some frontier guards and the chief of a frontier post, I asked Tsedenbal for permission to meet with them. We had a long talk about the almas. I asked them, "Since you all frequent the remote mountainous regions of Mongolia, would you help us seek out and capture a live almas creature? As you possess binoculars and accurate, rapid-fire weapons, you have the means to give us this assistance." I also promised them appropriate rewards for success.

They were all very interested in what I had said and promised to try as hard as they could to find one while patrolling the frontier. They agreed that it would be a fascinating assignment. They gave Damdin and Ravjir much information of a legendary kind. After Ravjir had spent the winter in the Gobi-Altai mountains, he found some dried dung, but it was difficult to tell whether it was of human or animal origin. He found the footprints of a large animal in mud and brought back some impressions of them. Again, when we delivered these to a Soviet scientific laboratory, they sent a reply saying that it was doubtful that these were the droppings or footprints of the almas. Thus, the research came to an end.

In actual fact, if one considers the views of the scholars of the world on the subject of the almas, there are many different opinions. A considerable majority believe that such an animal might have existed in ancient times, since there are many legends about it in Central Asia. There also could have been ape-like animals in the Himalayan mountains in pre-historic times. This is why European scholars have named it the "Snowman." Japanese scholars have accepted this idea and have been carrying out research in the Himalayas for many years. Another group of scholars claims that the almas probably wandered into those countries during an earlier era. Since the creature was wild and lived in remote grasslands, it fled from modern development, but it is not clear whether it became extinct. Even now, news of new sightings of the almas crop up from time to time. We can only say for sure that almas exists when we actually find one. The search for the almas will continue to attract the attention of readers.