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DOE review
completed.

NSC review(s)
completed.

State Dept. review
completed

INTRODUCTION

In most program areas, this report reflects a continuity of activity at the working level and the tone of lead agency submissions remains generally positive. But Soviet delays and apparent disorganization persist in some areas and several activities were postponed or cancelled because of inadequate Soviet arrangements.

During the quarter, US Co-Chairmen with the exception of those for Housing and Energy Agreements received approval to proceed with scheduling of the 1976 cycle of annual Joint Committee Meetings. Through August this step had been deferred following a US decision in / ^{March} not to schedule high visibility US-Soviet meetings in the wake of Soviet actions in Angola. As of the drafting date of this paper, no further action has been taken on Energy and Housing, but the other Joint Committees have either met or arrangements are in train with Soviet counterparts. In a related development, approval in principal has been given for scheduling of the US-Soviet Joint Commercial Commission, originally deferred with Housing and Energy, but a mutually acceptable date has yet to be fixed.

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SCIENCE AND TECHNOLOGY

The two sides have agreed to hold the Fifth Joint Commission meeting in Washington beginning February 2. Following a meeting of the US side of the Joint Commission on September 13, the US initiated an exchange of correspondence between the Executive Secretaries in preparation for expected Joint Commission decisions to change programs under the S&T Agreement in order to concentrate efforts in the most productive areas.

Under consideration are restructuring of projects and sub-projects in computer applications, chemical catalysis, and forestry; shifting the focus of microbiology work from industrial to academic aspects; and concluding, upon completion of work programs, some projects in electrometallurgy, metrology, and scientific and technical information. The Soviets suggest that physics cooperation, if initiated, be carried out under the General Agreement on Exchanges rather than under the S&T Agreement. We suggested conclusion of standardization working group activity, with Commerce and Gosstandart continuing to exchange information through direct communications. We also suggested limiting active cooperation in the water resources area to waste water for irrigation and plastics in construction. / Recommendation on the future of Science promised Soviet reports on financing and manpower. Working level activities during the quarter were as follows:

Computer Applications

Activities in this area during the quarter were both of high quantity and quality. A three-week seminar on agro-industry

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from September 26 to October 16 produced excellent papers and showed that Soviet and American approaches to modeling in this field are complementary. A workshop on methods of management education, from September 23 to October 3, also produced good papers and provided the US participants with new insights into the Soviet management system. Four US software specialists spent a month at the Research Computing Center of Moscow State University discussing sparse linear systems. In addition, a seminar on high level computer languages was held from September 6-17 in the USSR. Finally, the Working Group Co-Chairmen met in Moscow to review the status of the more than 20 sub-topics in this area. In our view, this working group rates high marks for both content and administration, having produced excellent results to date with the promise of more to come.

Chemical Catalysis

The Annual Symposium of the Joint Working Group on Chemical Catalysis was held in Kiev from July 5-7, 1976. The present five topics are to be reorganized and consolidated into four new topics-- namely, homogeneous catalysis by organometallic compounds (a slightly altered version of the present first topic); catalytic reactor modeling (same as present topic 2); characterization of catalytic systems of applied interest (a restructuring of fields now related to topics 3, 4 and 5).

We have proposed a change in the form of cooperation under the first topic (homogeneous catalysis) from joint experimental

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Aykazyan agreed to seek to keep this project going. Unilateral Soviet withdrawal from the agreed Electro-slag Remelt program would lead to uncertainty as to whether they will honor commitments in other programs.

US testing of a half-ton Soviet sample ingot provided under the Plasma Arc Remelting project continues, with resulting data to be exchanged with the Soviets at a symposium planned for next spring in Kiev. Cooperation on the electron beam evaporation project is also intensive, with a four-man US team^{having} visited the USSR in September, and plans for a Soviet researcher to visit the US for a two-month stay. In connection with the latter visit, we have proposed specific procedures consistent with the Soviet preference for "receiving side pays" arrangements and we await a Soviet response. The exchange of materials agreed to last year in the welding materials project were still taking place during the third quarter. Target dates for completion of studies on these materials have been extended to the summer of 1977 because shipments were completed later than planned.

Forestry

Most of the plans formulated by the joint working group on this subject in the Soviet Union last quarter have been implemented during this quarter. Two US teams were in the Soviet Union for an extended period (four weeks) to study fire prevention, one team at the Leningrad Forestry Institute and one at the Pushkino

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work to periodic consultations and exchanges of information by principal investigators, unless the Soviets can resolve continued problems of access to the key Soviet laboratory at Chernoglovka and of restrictions on travel of a key Soviet researcher, Volpin. The situation under Reactor Modeling, on the other hand, is improving because of the transfer of the Soviet project coordinator from Novosibirsk to the Karpov Institute in Moscow and the beginning of travel by long-term Soviet researchers to the US.

Electrometallurgy

The Fourth Meeting of the Joint US-USSR Working Group on electrometallurgy, held July 18 to August 3 in the US, found all project work /to be satisfactory, except data in electroslag remelt, where/exchange had been inadequate. This situation was partially remedied in September with the arrival of Soviet materials for testing in the US and the visit at MIT of two scientists from the Paton Institute. The scientists turned over segregation and thermal data and agreed on areas for further cooperation. However, continued activity in this sub-group was subsequently threatened by the news, brought by Dr. Aykazyan of the SCST, that the Paton Institute did not want to cooperate further because it might interfere with commercial opportunities to license Soviet technology. The US chairman has responded with the proposal that cooperation be continued at least in the two subprojects which are of a theoretical content, as this project holds considerable promise for both sides. Dr.

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fire center. Two USSR teams were in the US during September for shorter periods, one in the field of forest insects and the other in afforestation. The former team agreed with the US counterpart group that they jointly recommend the exchange of scientists for longer periods, up to four months, in laboratory and field situations.

Intellectual Property

The statements negotiated by the joint working group governing inventions and governing information and confidentiality were approved by an exchange of letters between the Co-Chairmen of the Joint Commission in August and October. We have proposed that future activity of the working group be limited to
preparation of reference material plus
conciliation of disputes on request.

Metrology

The Co-Chairmen of the US-USSR Joint Commission on Science and Technology have approved, by an exchange of letters in July and October, the recommendation of the Joint Working Group for Metrology for the following four new projects:

Radiometric methods for measuring solar spectral radiation;

Intercomparison of US and USSR time scales by use of transportable clocks;

Superconducting methods of relating electrical units to mechanical units (Josephson effect); and

Methods of high voltage measurements based on such phenomena as the Stark and Kerr effects.

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The US has proposed to the Soviets completion of the five existing projects on the intercomparison of standards for pressure, transportable volt, ionizing radiation, laser wavelengths and thermocouples and continuation of the remaining three projects: refinement of physical constants, automation of standards information and retrieval, and evaluation and publication of reference data on properties of materials.

Microbiology

A new project on Geomicrobiology (to deal with tertiary oil recovery, extraction of metals from ores, and oil and gas prospecting) has been approved by an exchange of letters in July and October between the Co-Chairmen of the Joint Commission. The Soviets informally agreed with a US proposal that the focus of all activity under the Microbiology Working Group be on academic rather than industrial aspects. However, no progress was made in developing a program of work implementing this agreement because the Soviets postponed a meeting of the Joint Working Group at the last moment. We are now unilaterally preparing a proposed program to reflect the new focus. This may lead to a shift in chairmanship on the Soviet side. The present chairman, Deputy Minister of Microbiological Industry E. R. Shenderoy, is mainly concerned with industrial activity. According to a Soviet SCST official, someone from an academic institution or the Main Board of Microbiology might be more suitable for the changed focus.

A symposium on the subject of enzyme technology was held

during the quarter at Corning, New York, with four Soviets in attendance. We found the Soviet contributions satisfactory.

Physics

We informally suggested to the Soviets in September that this topic of cooperation be terminated "because, on the basis of experience over the past several years, we no longer believe that it will be possible to undertake joint research by experts residing in the other country for periods of at least six weeks duration." Subsequently, the Soviets agreed at the working level to a six-week session next summer in the US in the area of astrophysics. The Soviet Executive Secretary informed us that the USSR could agree either to terminate cooperation in this area or to continue it. If continued, he suggested it be pursued under the inter-Academy program rather than under the S&T Agreement. Since the National Science Board does not favor long-term collaborative research under the inter-Academy program, if mutually acceptable conditions are developed, physics could conceivably end up as a special topic of cooperation between the Soviet Academy and the National Science Foundation under the General Agreement on Exchanges.

Science Policy

There was considerable activity in two of the four projects in this area during the quarter (planning and stimulation of R&D), and modest progress in the other two (manpower and financing). A meeting on systems for stimulating fundamental research was held in Moscow September 19 to October 2, which was considered quite

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successful by the US side. Access to Soviet science policy leaders was considered very good, the quality of papers presented by the Soviets was high, and the discussions were very productive. The papers exchanged will be published.

Progress under the project on planning and management of R&D is considered by the US participants to be satisfactory although not of uniformly high quality. Analytical papers and case studies which had been exchanged in the course of the summer were discussed at a meeting of the project group in Washington late in October. The Soviet delegation for the meeting was sizeable and of fairly high level. Papers will now be revised as appropriate in light of the discussions and prepared for distribution.

The US proposal made last May to hold a meeting on financing R&D remained unanswered. The US provided the Soviets with a draft report on financing in October and the Soviets promised to reciprocate by December 31. Similarly the US provided eight of 14 chapters of a report on training and utilization of scientific and engineering technical personnel and the Soviets promised a similar report by the end of November. Arrangements were made for a Soviet graduate student to visit the US late in the year on the manpower project.

Both sides agreed to postpone a decision on whether to continue or conclude the two projects on manpower and financing until the reports exchanged or soon to be exchanged have been studied.

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Scientific and Technical Information

Some Soviet materials on development of a common communications format for bibliographic data were received. Both sides have informally agreed that this project should be continued only for the time needed to permit its orderly transfer to an international forum and that the other project, dealing with forecasting and cost/benefit analysis, should be concluded now.

Standardization

Aside from the exchange of a few publications on standards, there was no activity under this topic during the quarter. We have proposed that standardization be dropped from the list of activities under the S&T Agreement and be replaced by regular communications between the Office of Product Standards in the US Department of Commerce and the Soviet GOSSTANDART.

Water Resources

Early in the quarter the Third Session of the Joint US-USSR Working Group on Water Resources took place in the USSR. The Working Group approved the topics for further cooperation proposed by sub-group I on planning and management, approved proposed exchange of visits for 1976-1977, encouraged direct contact between project coordinators since the program had entered the technical implementation phase, and requested project coordinators to prepare reports on activities of their groups from the beginning for use at the fifth US-USSR Joint Commission Meeting.

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The US Co-Chairmen of the S&T Joint Commission and of the Energy Joint Committee approved, in letters to their Soviet Co-Chairmen, a Soviet proposal for transfer of the cold weather construction project from the S&T Agreement, Water Resources area to become a second part of the Energy Agreement hydropower project.

There was considerable activity under the planning and management project during the quarter. Team I, dealing with prospective planning, met in the USSR in August to discuss "Evaluation of Runoff Deficiency and Ways of Its Reduction." The US experts spent three weeks in the USSR, visited ten sites and held consultations with counterparts. They concluded that the exchange of information was effective. The record of meeting includes recommendations for expanding joint efforts in three areas, subirrigation with waste water, soil properties, and irrigation of crop lands with waste water.

Team II, studying "Design and Construction of Big Canals," was in the USSR late in September and reported its satisfaction with the visit. They were shown everything they requested. The Soviets were completely forthcoming on all substantive matters. The US delegation was impressed with the sheer magnitude of Soviet canal operations. However, they concluded that the respective Soviet and American technology levels and match-ups may not merit long-term technical visits. On the other hand, there are evident commercial opportunities for the US.

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There were also two exchanges during the quarter under the plastics in construction project, one visit in each direction. A two-man US team went to the USSR in August to study the use of plastic pipe for irrigation and drainage. A five-man Soviet delegation came to the US to study plastics in hydrotechnical construction.

The US has informally proposed to the Soviets that the Working Group be essentially passive in the future on prospective planning, design of water projects, saline water for irrigation, and automation, leaving for active cooperation in the water resources area only waste water for irrigation and plastics in construction.

Private Sector Activities

Two Article Four Agreements were signed during the quarter. On September 20, Otis Elevator Company signed an agreement with the SCST covering the field of vertical transportation in office buildings, hotels, hospitals and schools. NCR signed an agreement on September 27 for cooperation in the field of automatic control systems for catering. Both of these agreements might be related to Soviet planning for the 1980 Olympics.

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ATOMIC ENERGY

Cooperative activities continued to develop satisfactorily in all program areas during the quarter, with the level of exchange particularly high in the controlled thermonuclear fusion area.

Fundamental Properties of Matter

The first meeting of the US-USSR Joint Coordinating Committee on Research in the Fundamental Properties of Matter (JCC-FPM) was held from September 9 to 11 at Fermi National Accelerator Laboratory in Batavia, Illinois. The Committee reviewed cooperation in FP, during 1976 and reached agreement on a program for cooperation in 1977 which will be presented for approval at the Fourth US-USSR Joint Atomic Energy Committee Meeting in December in the USSR. Most of the items listed in the proposed 1977 program represent continuation of experiments underway in 1976. If implemented, the program will allow US scientists a somewhat broader access to Soviet institutions than achieved in FPM cooperation in past years. The program also includes activities in two new areas of cooperation: materials science and nuclear science, representing a prospective expansion of cooperation in this area of the Atomic Energy Agreement. During the meeting,

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also, the US representatives stressed the importance to the continued success of the program of more rapid communication between laboratories or individuals concerning activities under the program of cooperation (slow Soviet responses at the working level have resulted in numerous delays in the past) and the Committee agreed that in furtherance of this aim, the telex link between the two Co-Chairmen of the JCC-FPM would be used when needed to facilitate communications between laboratories or individuals concerning program activities. The telex link was put to good use during the final week in preparing for the JCC-FPM meeting.

During September, the Fermilab Director tendered a personal invitation to Dr. A. Amatuni, the Director of the Erevan Physics Institute and a delegate to the JCC-FPM meeting, for Dr. A. Oganesian and L. Bagdasarian, both from the Erevan Physics Institute, to spend six months at Fermilab. The two Erevan physicists are to collaborate with Fermilab staff members on the testing of a transition radiation detector which was developed at the Erevan Institute, an important center of particle detection work. Also in September, Drs. Pavel Baranov and Sergey Rusakov, senior researchers from the Lebedev Physics Institute in Moscow were invited to return to Fermilab for four months to work on a joint experiment in proton-proton scattering at large momentum transfers; their work here represents the continuations of the joint

effort by Cornell, Northeastern and McGill Universities and the Lebedev Institute. Drs. Baranov and Rusakov were previously at Fermilab engaged in this joint effort from February 1975 to October 1975.

Additionally, during the third quarter, five Soviets and one Polish national, who is employed at the Joint Institute for Nuclear Research at Dubna, USSR, arrived at Fermilab for varying periods of time on two joint coulomb scattering experiments.

Controlled Thermonuclear Research (CTR)

During the quarter, four USSR teams visited the US, three for a 2-3 week duration and one for eight weeks. The Magnetic Mirror group visited Lawrence Livermore Laboratory (LLL) in continuation of the ongoing program of the experimental working exchange between US and Soviet experts in the field of magnetic mirrors - the major backup concept to the Tokomaks. The Fusion-Fission group attended a symposium at LLL to discuss all forms of fusion-fission systems. A wide range of topics were covered in this area, which represents a possible alternative approach for fusion power and in which the Soviets are particularly interested. The group on Turbulence Theory and Computer Modeling visited several US laboratories and universities to discuss instabilities in fusion plasma systems and the development of computer models to examine their behavior in greater detail. This visit was particularly useful to the theoretical group at

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Texas University where a concerted effort is being made on turbulent heating of plasmas. The eight-week stay by the Soviet group in Plasma Diagnostics included visits to several ERDA laboratories and several university campuses. The visits covered a wide range of subject matter. Considerable interest was shown by the Soviet side in plasma heating techniques, x-ray diagnostics, switching techniques, automated data acquisition and processing. This group's visit to the Los Alamos Scientific Laboratory was of particular interest to the US side since one of the USSR scientists was able to provide considerable insight into the imploding liner and related work at Krasnaya Pakhra.

The Soviet side delayed until the last quarter of 1976 the scheduled exchanges in MHD Theory, Theta Pinch Experiments and Alcator Experiments.

Five US teams visited the USSR during this quarter. One of these, comprising three scientists, spent three weeks at the Institute of Nuclear Physics, Novosibirsk, in relativistic beam work, of importance as a possible means of plasma heating and as a possible source of plasma instability due to run-away electrons. At Novosibirsk, the US team was provided the latest Soviet results on relativistic beam work. During this quarter one US CTR expert commenced a 16 weeks stay at the Kurchatov Atomic Energy Institute in Moscow and at the Efremov Institute in Leningrad, working on a key long-term technology problem -

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the design studies for blankets and shields which will be required for the breeding of fuel and withdrawal of heat in a fusion reactor.

The teams on Pulsed High Beta Experiments and on Energy Storage and Diagnostics visited the Kurchatov Atomic Energy Institute in Moscow and the Efremov and Ioffe Institutes in Leningrad. These two groups were also given an opportunity to visit Soviet research facilities at Novosibirsk and Sukhumi. Unfortunately, some of the experimental work of interest was not made available i.e. the scientists from the Krasnaya Pakhra facility were not available for discussion in Moscow as expected.

The Superconducting Magnet team discussed the Tokamak-7 at Kurchatov and plans for the Tokamak-10M magnets at Efremov. However, the US side felt that the visits to other nuclear physics and high energy research institutes did not provide information of significant value, partly because we were not allowed access to manufacturing and fabrication facilities. The US specialists considered that the Soviet side concentrated on the design and construction of the Tokamak magnets rather than on the development and design of basic superconductors, of particular interest to the US side.

Fast Breeder Reactors

The USSR shipment of heat exchanger tubing, unexposed to sodium, equivalent to the US intermediate heat exchanger tubing sent to the USSR in June, was shipped to the US in late July

and was sent on to Oak Ridge National Laboratory for study. The Soviet shipment completes the first materials exchange in this program area; tubing which has been exposed to sodium, will be exchanged for study by both sides at a later date.

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A four-man team of US specialists met with Soviet specialists at Obninsk, USSR from July 13 to 15 for discussions on FBR fuel cladding materials. The meeting agenda covered the following subjects: description and amount of cladding materials to be exchanged between the US and the USSR; proposed investigations to be performed by each country on the exchanged materials; proposed subjects for inclusion in the US-USSR Seminar on "Liquid Metal Fast Breeder Reactor Cladding Materials" to be held in the US in 1977. The US and Soviet specialists agreed to exchange the cladding material samples during the first quarter of 1977.

An eleven-member US delegation participated in a joint seminar "Some Aspects of Increasing the Reliability and Ensuring the Safety of Operation of Steam Generators for Sodium Cooled Fast Reactors" at Dimitrovgrad, USSR from July 26 to 31. During the Seminar, twelve Soviet and ten US reports were presented and discussed. At working group sessions the following questions were discussed: interaction effects on small leaks of water into sodium, interaction effects on large water leaks into sodium and corresponding protective systems for steam generator; and methods of leak detection and carbon transport. Programs for US-USSR cooperation in these areas were developed and agreed upon by the two sides and will be submitted for approval to the FBR Joint Coordinating Committee during its next meeting scheduled

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for October 20-29 in the USSR. Following the Seminar, the US specialists visited the Physics and Power Institute at Obninsk and the BN-350 FBR installation at Shevchenko. The US participants found the seminar sessions informative and learned more about problems being experienced by the Soviets with their steam generators.

Upcoming Events

The highlight of the fourth quarter will be the 4th US-USSR Atomic Energy Joint Committee Meeting to be held from December 6-10 in Erevan, USSR. The Joint Committee will discuss and evaluate program activity which has taken place under the Agreement in 1976, and will consider and is expected to approve program proposals for joint activity in 1977. A topic of interest on the agenda will be the discussion of a proposal to test an American steam generator evaporator in the Soviet fast breeder reactor facility at Shevchenko.

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ENERGY

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We took no initiative again during the third quarter to reschedule the second US-USSR Energy Joint Committee meeting, which we postponed last March in response to Soviet policy in Angola. In spite of the continued postponement, working level activity has generally continued unabated, with agreement finally reached on gas and oil topics to be recommended to the Joint Committee for cooperative projects.

Electric Power

Thermal Power: A three-man US team which toured the Soviet Union in June to study the design and operation of thermal power stations, reviewed its impressions upon return to the United States and concluded that, although by US standards the boiler equipment was rather dated, the operating record, in terms of availability, is remarkable. They believe this result is due to following rigid maintenance schedules. They also felt they had met with complete openness to share technical information.

The two sides exchanged papers on water treatment for fossil and nuclear power plants during the quarter. The US side is, furthermore, collecting additional papers to answer questions asked by the Soviets at a joint meeting last quarter in Moscow. In response to a Soviet expression of interest, the US side has offered to host a visit by USSR experts to view actual nondestructive testing work in

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progress at a fossil fuel plant in April 1977. We have requested a return visit by US experts to the USSR on the same subject.

The
Hydropower: Deputy to the Soviet Chairman of the Joint Committee Maksimov wrote to US Chairman Zarb asking US consent to the transfer of

hydrotechnical
cold weather/construction from the S&T Agreement water resources area to the Energy Agreement hydropower project

appears to be motivated
The Soviet side/by bureaucratic considerations.

It is in our interest for cooperation to proceed as smoothly as possible. We have no major difficulty with the Soviet proposal and have notified the Soviet Minister of Power and Electrification and the Chairman of the SCST of our concurrence.

Heat Rejection: In return for the visit by a US delegation to the Soviet Union last year, the US side has offered to host a visit by a Soviet team this November in the field of dry/wet cooling towers. The visit will include a two-day seminar in Washington and tours of relevant sites including TVA.

Air Pollution: Arrangements have been made for the visit to the United States of a Soviet team on gaseous

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emissions in October. A full day of the program has been set aside for the Soviet experts to present a symposium on environmental considerations and environmental control plans associated with the USSR's proposed large coal-fired electric power generation complexes. The group will also be able to see an exhibition of commercially available monitoring instrumentation.

Ultra High Voltage: No meetings or visits were held during the quarter on UHV, but agreement was reached as to reports the two sides would prepare for their meeting next summer. One priority item for study will be methods used in experimental and clinico-physiological research for evaluating biological effects due to electric fields.

Superconducting Transmission: The Fourth Meeting of the Joint Organizing Committee in the field of Superconducting Power Transmission took place in August at Brookhaven and Stanford. Plans were further developed for the shipment of a US manufactured cryogenic refrigerator to the Mosenergo Test Facility in the USSR and the provision of a Soviet-built flexible or rigid superconducting cable to the United States. A draft contract for the loan of the US refrigerator was provided to the Soviets along with information on the general characteristics of the machine. A US team will visit

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the USSR in the last quarter of 1976 to determine which type of Soviet cable is preferred for the joint experiments in the US. The US side is also considering the possibility of having a Soviet built refrigerator loaned to the US instead of accepting the Soviet cable as the next stage in reciprocity for the US refrigerator.

Two additional Soviet organizations involved in research in the superconducting field were represented at the meeting, both under the Ministry of Electric Equipment Industries. This was considered a gain for the US in that it broadens the scope of cooperation. The value of the large number of reprints of articles and reports in Russian provided during the meeting will not be known until translation and evaluation is complete.

Magneto hydrodynamics: Joint acceptance tests of the US built electrode walls for the Soviet U-02 MHD facility were conducted in August. The suitability of the electrode module specifications was confirmed. The test results are listed in five Acts, consisting of visual inspection, acceptance of equipment, electrical tests, hydraulic tests, and thermocouple integrity tests. Following the acceptance tests, the second 100-hour joint US-USSR electrode tests were conducted at the U-2 facility during the period of 21-27 September 1976. The test section consisted of electrode

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walls made by the US and of insulating walls supplied by the USSR. The main purpose of the experiment was to conduct a life test of the materials and construction of the US electrode walls, particularly the behavior of ceramic materials under MHD generator operating conditions. US and Soviet specialists were present at all times at the U-02 facility. Both sides considered this test to be highly successful. Much valuable data and experience was obtained which will lead to ^{an} advance in US technology in this area.

Solar: After many months of delay the Soviets finally arranged for a mid-October visit by a US team on the subject of photoelectric conversion. However, the program permitted only minimal opportunity to learn about Soviet photoelectric technology. Unless experience at a Symposium scheduled for January is better, there would seem to be little point in continuing this project.

Coal

The Soviet Executive Secretary for the Environmental Agreement advised us of the Soviet preference to continue cooperation with the US in the field of coal cleaning under the Environmental Agreement. The Soviet Coal Ministry had previously informed us that the Soviets wish to pursue this topic only under the Energy Agreement/ and has recently reiterated this position. We have asked

the Soviet Co-Chairman of the Energy Joint Committee to provide us with a coordinated Soviet position.

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A group of Soviet specialists on this topic is expected to come to the US late in November under the Energy Agreement.

Oil

After several exchanges, the US and USSR sides of the temporary group of experts have reached agreement on topics to be recommended to the Joint Committee for cooperative activity, under the general headings of exploration and enhanced recovery. The forms of cooperation are to include short and long-term exchange of specialists, the exchange of information, symposia, and the exchange of oil samples. US coordinators have now been named for the sub-topics and the industrial sector has been invited to participate. Assuming Joint Committee approval, the next step will be to determine detailed work programs and set schedules for project execution.

Gas

In October, the Soviets confirmed their agreement with the US February proposal on gas topics to be recommended to the Joint Committee, namely arctic operations and enhanced recovery. A Soviet team of experts on the latter topic visited the US in October. The Soviets have not yet set a date for a US visit to the USSR on construction and operation of pipelines and wells in arctic conditions, the topic of most interest to the US. The Soviet Ministry of Home

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and Community Economy has agreed to receive a US delegation on city gas distribution, a topic which the American Gas Association wishes to explore.

Pollution by Gas and Oil

A US delegation which visited the Soviet Union to study developments there during the quarter was

denied permission to visit Gazli to view earthquake damage to gas installations there, the Shatlyk gas field and Khiva compressor station, ^{where we had hoped} to discuss operational problems resulting from the reported 1975 breaks in an above ground natural gas transmission line from too high internal pressure; ^{where we wanted} and Baku, to observe drilling operations offshore.

The US delegation was apparently the first such group to visit petroleum operations in Fergana and a Druzhba pipeline facility; but what they saw there was carefully stage managed. The Soviet papers presented at a symposium were superficial. Informal discussions at the symposium were more profound but of limited duration. During the visit the working group agreed to consider eight topics for possible future cooperative work. In the protocol signed

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on September 30, both sides agreed to specify measures, including proposals for working programs, for joint cooperation on any of the eight topics, the Soviets to do so by January 1, 1977 and US by March 31, 1977. Unless something meaningful develops from this process, the case for continuing this project will be weak.

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AGRICULTURE

Some additional progress was made toward the five main US objectives under the Agreement in the third quarter, but less than expected and less than in the previous three months. The Soviets met ^{part of} an agreed schedule of supplying economic data to us--for example, in monthly output of ^{selected} food industry products and livestock ^{numbers} on state and collective farms. However, they fell behind on several of the most important ones, such as breakdowns of fertilizer use for 1975 and crop areas for 1976. More new contacts were made with Soviet institutions and individuals through team exchanges, but contacts were limited by the need to cancel several planned exchanges. There was similar limitation on the increased exchange of agricultural research information and materials, and on new preparations for mutually beneficial research projects. Activities which probably did or will contribute to market development for US agricultural commodities did approximate expectations.

The number of team exchanges was only about half of the second quarter total, partly because the US cancelled two of its scheduled teams and the Soviets postponed two of their teams until the fourth quarter and two others until 1977.

Serious problems continued with the

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timing and content of the Soviet programming for US teams.

Research and Technological Development

Two US teams were sent to the USSR and one Soviet team was received here under this working group. Results of the first US team were mixed, and programs of the other US team and the Soviet team were not completed until mid-October.

The initial program offered by the Soviets to our Team on Physiology of Farm Animal Reproduction arrived late. We made partly successful attempts to get needed improvement and clarification. The first part of the resulting program was devoted to a workshop where scientists from both countries presented review papers on the status and research needs in selected areas. The papers presented by the Soviet participants were generally acceptable; however, very little new or adequately tested results were presented. One major limitation was the fact that the Soviet interpreter was not familiar with scientific terms, which seriously limited the opportunity for effective exchange of information. The visits scheduled after the workshop did not comply with or fulfill the request made by the US side. The US scientists were not permitted to observe bulls or boars under the USSR management systems. Their request to observe beef feeding operations and large swine complexes was denied. The Team had only limited opportunities to observe basic research laboratories on reproduction.

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Despite detailed preliminary requests and multiple requests while in the USSR, the Team was denied any opportunity to see how boars are handled and managed, or how semen for artificial insemination is collected. Farms and artificial insemination centers selected by the Soviets, in the opinion of the Team, were inadequate.

The Soviets first offered us the program for our Sugar Beet Breeding and Growing Team a few days ahead of time, a very welcome change. However, the offer omitted several important research centers that were needed and which we had requested. We took followup measures with considerable success, but one major type of research facility was denied and some of our questions remained unanswered at the time the Team departed the US.

Several members of the USSR Team on Cotton Growing and Harvesting met the US Cotton Team while it was in the Soviet Union, and two members of the latter helped brief the former on its arrival in Washington. This familiarity may help us get the rest of the data promised to our Cotton Team, but if necessary, we can hold back on some of the information requested by the Soviet Team. Several of the US hosts scheduled for the USSR Cotton Team are concerned about the US Cotton Team's difficulty in obtaining needed information from the Soviets and have sought our advice about how the USSR Cotton Team should be hosted.

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Economic Research and Information

Of the three US teams in this area, the first appraised the 1976 USSR spring wheat situation, the second studied current cotton prospects and ginning and use of cotton, and the third evaluated the present sunflower seed crop and status of vegetable oil production and consumption. We encountered major difficulties in arranging each of the programs. In each case, the Soviet response to the US request for a program was late and the Soviet offer was too limited to be accepted. We would initiate attempts to get the Soviet offer improved but would be compelled to decide to send the team for the sake of salvaging what we could, even though time did not permit completion of negotiations for program improvement. In the end, a program sufficiently improved to make the trip worthwhile would finally be received in the USSR, but in all cases the final program was not as good as had been requested.

For our Spring Wheat Team, the Soviets first promised that their response would not be more than one day late. This was followed by frequent new assurances which were not carried out, and the Team had to finish the battle for an adequate program in Moscow. The program actually received contained much less ground travel than requested, and the drier areas around Pavlodar and in Altay Kray were refused, but the unexpected addition of the important Kustanay and Kokchetav regions made the trip worthwhile.

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The Cotton Team originated with our special request that it be added to the list originally agreed for team exchanges in 1976. The willingness of the Soviets to receive this Team seemed to be a good omen, even though their decision undoubtedly was much influenced by the fact that we previously had accepted an additional Soviet team. Their response to the program request for this Team was short of the agreed 20-day deadline, however, and they failed to respond to our requests for improvements to and clarification of their first offer before the Team arrived in Moscow. The Team saw an adequate number of farms, gins and research units, and was well-treated socially, but access to the key Fergana Valley and the new Kashi and Dzhizak areas was denied. Data on cotton ginning and cotton consumption were not provided at the end of the visit as promised. The next Soviet promise was that their Cotton Team would bring these data to Washington and this was partly fulfilled. Our Team also disliked the way that one of its Soviet escorts, who was later a member of the USSR Cotton Team, interjected himself into the interpreting to cut off answers being given and supply different answers in their place.

For our Sunflower/Vegetable Oil Team, we gave the Soviets, at their request, about four months to work out a program that covered the Team's stated objectives. The full Soviet response still was late and limited, and hard bargaining had

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to be used to try to get an adequate program. Notable improvements were obtained but the program was not completely known until the Team arrived in Moscow. Observations permitted our team in sunflower areas and in oilseed processing plants was limited, making results of this visit far from satisfactory.

We cancelled plans for a Team on Study of USSR Planning of Milk and Meat Production, because our specialists decided that not enough additional information could be obtained over and above that collected and developed last spring by the US Team on Study of USSR 1976-80 Livestock Plans. Plans also were dropped to send a Team to develop multi-year joint research on Forecasting Production and Use of Agricultural Commodities, when the Soviets failed to provide any of the information needed to prepare for such a visit.

No USSR teams were received under this working group, since the Soviets postponed until 1977 expected teams on Grain Storage and Protection and Agro-Industrial Fruit and Vegetable Complexes. The latter was postponed for the second year in a row.

Soviet Bureaucracy

The Soviet Secretariat in the USSR Ministry of Agriculture (MinAg) claimed that the USSR Ministry of Food Industry was to blame for much of the difficulty with the program for the US

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Sunflower/Vegetable Oil Team. This indicates to us that MinAg is still reluctant and inefficient, and perhaps lacking adequate clout, in acting as the Executive Agent for the Soviet side in making the necessary arrangements for our visiting teams under the US-USSR Agricultural Cooperation Agreement. We plan to propose at the December Joint Committee Meeting that both sides / enforce the existing agreement for a 20-day deadline for notification of arrangements for team visits before departure. We also want to set a 10-day deadline for agreement on revisions necessary in original program offers.

US Administrative Problems

The heavy run of programming problems for US teams going to the Soviet Union, which began in the second quarter, continued through most of July, August and September. Over a period of about four months, the Soviet response to our request for programs was late for eight consecutive US teams before one finally was received on time. For an additional case there was no response at all. For most of these eight cases, program content was unacceptably limited in the initial offer, and we had to try to get improvements in the short time remaining before the team visit began. Our efforts brought some notable success but not enough to save one visit and not as much as desired for the others. These additional problems were experienced even though we continued to fill Soviet program

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requests in timely fashion.

Private Sector

The 1976 exchange of 15 young agriculturists each way between the National 4-H Foundation of the US and the USSR Ministry of Agriculture was completed. The US group represented 10 states and included two women. The Soviet participants were all men, mostly from European USSR and mostly married. Both sides have termed the 1976 exchange a success in that it could be arranged and took place, but both sides also have indicated that some improvements can and should be made in future years. We particularly want US 4-H participants to live on Soviet farms, see more different areas, and generally have more contact with Soviet farm families than was the case in this first exchange.

Upcoming Events

Consecutive meetings of the two working groups and the Joint Committee will be held 1-10 December. The main issue that we intend to take to these meetings is the lack of reciprocity for us on the timing and content of responses to program requests for visiting teams and individuals. One US team and four Soviet teams are scheduled to be exchanged in the October-December period which, if realized, would make a total of 13 for each side for the year.

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TRANSPORTATION

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The US Executive Secretary met briefly with the Soviet Executive Secretary in September during the latter's visit to the US as a member of the Soviet Urban Transport Delegation. We discussed with him the Coast Guard's disappointment at the thin agenda planned for the ice transiting meeting and brought up some administrative and logistical problems connected with hosting Soviet delegations. He could not indicate when the Soviet side would be ready for the Joint Committee meeting but thought that it would be timed to follow the Kirillin-Stever meeting under the S&T Agreement, now set for February 2, 1977.

Much progress has been made in gaining Soviet bridging and tunneling technology and railway transport information and data. Ice transiting is currently stalemated. We continue to have excellent support for US positions in international organizations. The prospect that the Soviets may reopen negotiations with Sperry-Univac for the purchase of an Air Traffic Control (ATC) system could become a definite plus for the US.

Transport of the Future

We brought Soviet specialists up to date on US research in this area (magnetic levitation) during a May visit. We note much Soviet interest in this field but little work that would be of interest to us. Another complicating factor is that due to severe

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budget cuts in US programs several years ago, there is little incentive to seek more active cooperation with the Soviets. During the May meeting, the Soviets agreed to keep us informed on their continuing research to solve technical problems in this area. We cannot yet judge their performance in this regard since no reports were received this quarter.

Transport Construction

Reports and documents which the Soviets sent us during the past several months are now being translated and evaluated. A particularly comprehensive Soviet report on the methods of measuring loads on tunnels and tunnel liners is believed to be a significant contribution to the cooperative effort. In September we hosted a Soviet Delegation and in October a US Delegation will visit the Soviet Union to become familiar with highway and subway tunnel construction, tunnel instrumentation, and various types of large bridge construction. Discussions are continuing on plans for conducting the joint project on measurement of loads on tunnel liners.

Railway Transport

Evaluation of the large volume of books and papers which the Soviets brought with them in May continued throughout this quarter. We have almost completed compiling data and gathering reports in answer to specific questions

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raised by the Soviets during the May visit. With regard to the joint rail hardware exchange project, no reports are available as yet on the testing of the Soviet concrete ties. Negotiations for the sale of the 200-300 draft gear mechanisms by Cardwell Westinghouse of Chicago are continuing.

Civil Aviation

Air Traffic Control: As suggest by the Soviets, a meeting planned for the next quarter was postponed until later this year or possibly February 1977. We would consider it a significant development if the Soviets are indeed reopening negotiations with Sperry-Univac for the purchase of an ATC system. Provided the Soviets conclude a contract with a US firm, some of the topics of discussion in this area, cut back as a result of the contract with STANSAAB, will be restored. Additionally, we would follow through on our previous commitment to provide software and training in connection with procurement of a US ATC system.

Non-Visual Landing Systems: In several recent International Civil Aviation Organization (ICAO) meetings, the Soviet representatives have unfailingly upheld the US Time Reference Scanning Beam (TRSB) as superior to the UK

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Doppler as the world standard microwave landing system. During the July ICAO meeting, our experts, with Soviet support, pointed up a serious problem with the multipath reflection found in the Doppler system. Certain doubts as to actual Soviet expertise in this area dissolved during the US Delegation's visit to the USSR last August when the Soviets demonstrated to our satisfaction their proficiency in this area and their capability of making a substantive contribution to the international debate on this issue.

Accident Investigation: Last August the US Delegation reported exceptional progress in this area. They received manuals and documents regarding Soviet accident investigation procedures, saw demonstrations of operation readout on flight data and cockpit voice recorders, saw how the Soviets use this data in monitoring crew performance (e.g., how some crews clearly show a need for further training), took tours of three training academies for pilots (Leningrad), engineers (Kiev) and air traffic controllers (Ulyanovsk), and were fully briefed regarding the organization and functions of the State Aviation Supervision Board (SASB), which is, except for its broader scope, a rough equivalent to the National Transportation Safety Board (NTSB). The NTSB now

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has full voting rights as an SASB accredited representative on Soviet international accident investigations. Future subgroup plans include: (a) working out free exchange of domestic accident data by next year (which the Soviets have been reluctant to do), (b) a student exchange program, and (c) working out proposals for changes to ICAO standards to improve accident investigation participation rights and adherence to data recording regulations--which has particular significance in relation to African countries.

General Aviation: During September, a Soviet delegation saw demonstrations of industrial and agricultural applications of helicopters such as crop dusting, logging, forest fire detection and control; and discussed weather modification research and operational work. It also discussed the four working programs adopted last July in Moscow and agreed to conduct joint research on those topics.

There has been no activity in the Training, Airworthiness, or Security subgroups this quarter. We proposed that the latter two topics be put in the inactive category for 1977 since, (a) the Soviets appeared to be "using" the Airworthiness subgroup to discuss issues involved in the negotiation of a US-USSR Airworthiness Agreement (a State matter), and (b) the incompatibility of the two approaches stemming from differences in governmental systems militates

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against any payoff for the US in the Security subgroup. We do not yet have any Soviet reactions for these US proposals.

Marine Transport

Ice Transiting: We postponed a planned September US Delegation visit to the USSR because the proposed agenda offered the US side little, if any, technical benefit. Although the Soviets have responded affirmatively by somewhat strengthening the program, they are still refusing to allow a visit to a modern Soviet icebreaker. The USSR Merchant Marine Ministry panel leader asserts that icebreakers are not under the Ministry's jurisdiction and, therefore, he cannot accommodate the US request. We expect the Soviets to be forthcoming enough in substituting other items to make the visit feasible next quarter.

Ocean Commerce and Cargo Handling and Ship Equipment and Crew Training: Although MARAD is experiencing a travel funding squeeze, they are planning to send a delegation to the Soviet Union in November to cover program topics under these two panels. In connection with the latter panel we have asked the Soviets to discuss the USSR Merchant Fleet Management Information System, prospective uses of synchronous satellite systems for fleet management (search

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and rescue) and vessel traffic systems operations in addition to the regular program topics.

Safety of Life at Sea (SOLAS) and Ocean Wave Spectra

(OWS): There has been no activity in these subgroups this past quarter. We have proposed that they become inactive next year as there seems to be no particular gain for either side, especially since SOLAS issues do come up in Inter-governmental Maritime Consultative Organization. We believe (contrary to Soviet opinion) that reliable instruments do not presently exist for carrying out the measurement of hull stress program envisaged for the OWS panel.

Automobile Transport (Highway Safety): Soviet testing of a US-designed safety device (which prevents a subpar driver from starting his vehicle) has been postponed until the first of next year because of an unanticipated delay in delivery of the device by its US developer. We expect a late spring 1977 delivery. In the meantime we are awaiting the Soviet input concerning the modifications necessary to put the device in their vehicles. We are also awaiting a Soviet response on our proposal for exchange of data on child occupant accident survival statistics.

Facilitation of Cargo Documentation

The Soviets have been informed that, due to an internal DOT review of the Cargo Data Interchange System (CARDIS),

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we would have to postpone indefinitely the joint cargo data demonstration project between Leningrad and a US port planned for this fall.

Urban Transport

During September, we hosted an enthusiastic Soviet Urban Transport Delegation which had particular interest in automated urban traffic control systems. The sides agreed to consider holding a joint symposium on the development of urban mass transportation systems and agreed to exchange information on a number of topics of mutual interest during the next year.

Hazardous Materials

Through the cooperation of the US Executive Secretary of the US-USSR Environmental Protection Agreement, we were able to include a DOT pipeline safety expert as a member of the US Environmental Delegation to the USSR in October under the Northern Ecosystems project of the Environmental Agreement. The DOT member also planned to hold preliminary discussions on the possibilities for cooperation in the transportation of hazardous materials, as agreed during the 1975 meeting of the Joint Committee on Transportation.

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Soviet Bureaucracy

The Soviets continue to be unresponsive when communications problems or other misunderstandings arise which necessitate changes in plans. Last July we planned that after FAA representatives attended ICAO meetings at the Hague, they would proceed to Moscow for visits to Soviet MLS installations. Due to a rather inexplicable mixup in dates, the Soviets stated they could not receive the delegation immediately following the ICAO meeting, and we were therefore obliged to have our people return home and regroup for an August trip. Later, the Soviets apologized and commented that they should have been more flexible. We suspect that "dress rehearsals" may have been in order as a result of discussions in the Hague with regard to what the US Delegation wished to see during its visit.

US Administrative Problems

Communications have greatly improved as the Soviets now almost exclusively use US Embassy channels for mail and messages.

We have experienced some annoying administrative and logistical problems in hosting Soviet delegations: (a) non-ticketing by Aeroflot for planned internal US travel (plus

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Soviet surprise that extra US dollars would therefore be needed) and (b) a general lack of communication on changes in Washington arrival plans. We have proposed solutions to the above problems to the SCST via US Embassy channels.

Funding for travel, translations, and hospitality continues to be a key problem in the implementation of the Soviet program. DOT believes that the Administration, if it considers the Soviet bilaterals important, should address this problem and come up with a solution. At the very least, it should be prepared to reiterate "in house" the importance of the program to generate some enthusiasm for taking it out of the agency's budgetary hide.

Upcoming Events

The 1976 Joint Committee Meeting date cannot be set until we receive and study the Soviet priority program list. Judging from the comments of the Soviet Executive Secretary, we do not anticipate holding the meeting before January or February of 1977.

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MEDICAL SCIENCE AND PUBLIC HEALTH

While no major meetings actually took place during the third quarter, we agreed to October 25-29 dates and proceeded with preparations for the Fifth US-USSR Health and Artificial Heart Joint Committee Meeting. In preparing for the meeting, HEW undertook a review of activity under all program areas and concluded that with the exception of the project area on the Organic Basis of Schizophrenia, progress in all priority areas under the individual visitors exchange, has been satisfactory. During the quarter, ten Americans traveled to the USSR in the fields of clinical psychology, nursing and primary health care, virology, physiological psychology and biomedical communications. The Fogarty International Center, NIH, received and programed 19 Soviet exchangees in the fields of critical care medicine, spinal cord regeneration, microbiology, experimental hypnosis, psychosomatic psychology, primatology, transplantation, vaccines and anesthesiology.

Cardiovascular Diseases

Pathogenesis of Arteriosclerosis: One Soviet biochemist working in the nutrition area of this joint project began a two-month visit to key lipid research centers in the US.

Management of Ischemic Heart Disease: Both sides continued with patient recruitment for a joint study to evaluate different forms of therapy in the management of chronic ischemic heart disease manifest by chest pain. Preparation continued during the quarter for the first Joint US-USSR Symposium on the Management

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of Ischemic Heart Disease, scheduled to take place in Moscow during October 1976. The itinerary for the US delegation to this symposium includes a visit to the scientific facilities in the city of Irkutsk, the first time this Soviet city has been included in the itinerary of a cardiovascular delegation.

Sudden Death: The first Soviet fellows in this area arrived in the US to begin an extended stay in two planned subareas of cooperation. A Soviet pathophysiologist will work on a protocol in the pathology area of this project. In the area of antiarrhythmic drugs, the other fellow will visit two US laboratories to become familiar with US research and trends in identifying the relationship between arrhythmias and sudden death in victims and in survivors.

Oncology

From September 27 to October 8, the Third US-USSR Oncology Program Review was held in Bethesda, Maryland. Satisfaction was expressed by both sides with the ongoing program in all six problem areas. Highlights of the meeting are outlined below.

Cancer Chemotherapy: Since the cooperation began in this area, 155 anticancer drugs and chemical preparations (59 American and 96 Soviet) have been exchanged and jointly tested. Encouraging preliminary results have been obtained this quarter by the Soviets in combined modalities treatment of small cell carcinoma of the lung by using the American drug CNU and the Soviet drug Methylnitrosourea.

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Cancer Immunology: In this problem area the Soviets reported an interesting finding: in high risk groups with the local form of melanoma, there was some delay in the onset of metastases during the first year of observation of patients who had received BCG as an immunoprophylactic treatment. The patient numbers in this study were small, however, and US and Soviet coordinators have agreed to continue the study of this relationship.

Cancer Virology: Both sides agreed to continue joint work in this area with emphasis on the role of viruses in the induction of human breast tumors. There was also agreement to discuss further joint studies on "recombinant DNA" and "viral pseudotypes" at the next joint meeting of the delegation. It was also understood that, if and when such studies are undertaken, US participants would be obligated to follow the NIH guidelines for all RNA-DNA recombinant research.

Mammalian Somatic Cell Genetics: While both sides are independently active in the areas approved for joint study, cooperation has only progressed to the exchange of scientists, information and materials. Hope was expressed that this area will now progress rapidly to joint studies.

Cancer Epidemiology: An active exchange of information has continued in this problem area in the past months and agreement was reached at the Annual Program Review for the preparation of a joint study on the epidemiology of cancer of the cervix, uterus and ovaries. Most importantly, both sides have agreed

that standards of presentation of epidemiological data must be developed rapidly and that each may work with other international organizations to assist with these uniform procedures. By the end of October, each side will deliver to the other their chapters for a joint monograph on "Epidemiology of Tumors in the U.S.A. and U.S.S.R." This monograph is scheduled to be published in the Journal of the National Cancer Institute in the US and the Meditsina Publishing House in the USSR.

Cancer Control and Cancer Centers: Significant advances in this problem area were discussed at both the Oncology Program Review and the Third US-USSR Cancer Control and Cancer Centers Meeting (August 30 - September 10). US and Soviet specialists agreed that joint studies had revealed that breast cancer can be detected at an earlier stage by using a combined four modality screening method including history, physical examination, mammography and thermography. Discussion also centered around initial study results from both countries which indicate that mammography and physical examination have proven to be more reliable breast cancer detection tools than thermography. During this meeting, both sides agreed to carry out a prospective study of 300 potentially curable breast cancer patients. A questionnaire was jointly developed and will be administered to patients postoperatively. The questionnaire will be completed in English and returned to the National Cancer Institute for computer processing.

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Influenza and Acute Respiratory Diseases

Etiology and Immunoprophylaxis: Arrangements were made during the quarter to exchange sera of national populations for comparing age-specific swine influenza antibody levels. The purpose of the study is to determine if the US has a higher rate in younger age groups, a finding which may suggest more frequent introduction of the virus in the US.

Chemo-Interferon Prophylaxis: Additional antivirals have been sent to the USSR according to previously agreed-upon schedules.

Organic Basis of Schizophrenia

Complications with the planned exchange of one young Soviet researcher, Dr. Gindilis, have developed. A US exchangee within this project area worked with Dr. Gindilis in the Soviet Union last year and plans were being made for Dr. Gindilis to travel to the US this year to continue some ^{research} activities. In correspondence between the project area coordinators over the past quarter, however, it has become clear that the Soviets now will not allow Dr. Gindilis to work in the program and certainly not travel to the US. The US participants recognize that Dr. Gindilis, a young Jewish scholar still in training, may be in trouble with his Institute authorities.

Soviet Bureaucracy

Although not a new problem, during this quarter one American applicant withdrew his proposal under the Individual

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Specialist Exchange Program because of a tardy response from the Ministry of Health about the program which could be arranged for him. This candidate did indicate, however, that he may apply again in the future when he has more flexibility in his personal schedule.

Private Sector

The coordinators within the Artificial Heart priority area have recently become aware that a US medical marketing firm (WJS, Inc.) has been making contacts with USSR scientists involved in the joint program. Although no one is aware of any major purchases, the Soviet coordinator in the area, Professor Shumakov, mentioned during his recent visit to the US that one of the US artificial kidney manufacturers has set up several "free" test units at his Institute of Transplantology in Moscow. The Soviets are apparently supplying the firm with data in return.

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HOUSING AND OTHER CONSTRUCTION

There was progress at the working level in four of the six working groups under this Agreement.

Building Design and Construction Management

Our intermediate objective of developing and exchanging technical materials on design and construction management has proceeded from our side, although the Soviets have not yet responded in kind. Preparations for exchange of experts in this area during the fourth quarter, however, has proceeded adequately.

The project team on Norms and Standards submitted technical papers to its Soviet counterpart on June 15 and August 6, 1976. To date no acknowledgement or response has been received. A follow-up letter was forwarded on September 24, 1976, with no response forthcoming. The project team on Organization and Technology of Design also forwarded technical papers and material, on September 15, 1976, but again no acknowledgement or response has been made by the Soviet side. The US funding problem for this working group has been partially resolved with the approval of a specific budget for GSA participation in the Agreement. In terms of meeting overall costs, the provision is skeletal, but it provides for continued participation on a "sending side pays" basis.

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The Leo A. Daly Co. agreed to host a group of Soviet officials in October on organization and technology of design and the Harvard Graduate School of Design agreed to assemble a two-day seminar for the same group. However, the Soviets postponed their visit, thereby complicating our efforts to keep the private sector involved in our programs on a smoothly operating basis.

Project-level work has developed during the quarter with preparations for a US visit to the Soviet Union 10-17 October under the project on Construction Management. We expected a Soviet team on Organization and Technology of Design to visit the US October 26-November 5, but their visit has been postponed until January. Additionally, an invitation has been received to have US project teams visit the USSR during the first quarter of 1977. We hope to gain a better understanding of Soviet expertise and the prospects for mutually beneficial cooperation in this field as a result of these visits.

Industrialized Building Systems and Utilities

There was significant activity on the American side by NAS/BRAB to establish five projects under this working group. Telephone and letter contacts were made with each project group with special emphasis on those groups in industrialized buildings and utilities which are scheduled to either receive Soviet delegations or travel to the Soviet Union during fourth quarter 1976. The HUD-BRAB contract

duration is from July 1, 1976, through March 31, 1978, which covers one complete exchange of project and subproject groups as well as the second Working Group meeting scheduled for the Soviet Union in the first quarter of 1978.

Many contacts have been made with private sector individuals inviting their participation on the projects and subprojects of this working group. There still appears to be a reluctance on the part of a number of firms and trade associations to make a commitment to this endeavor for several reasons. For example, many US firms see Soviet technology at a lower level than ours, and many have had bad experiences with Soviet commercial contacts that seem more oriented towards eliciting data and prices, rather than towards actually signing contracts. However, HUD believes that at least in the building systems area competent American delegations on the order of four to six federal government and private industry individuals can be organized. In this regard, we have sought to impress on the Soviets the importance to the cooperative program of their treating US private sector participants well. For reasons unclear to us so far, the utilities area still appears to attract greater private sector interest.

In November Soviet delegations on the following projects and subprojects will visit the US: (1) Designing of the Factory Processes for High Volume Production of Building Systems, (2) Designing and Construction of Large Reservoirs, Smokestacks,

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Cooling Towers, and Silos of Metal and Concrete, and (3) Utility Systems for Populated Areas.

Building for Extreme Climates and Unusual Geological Conditions

The US and Soviet Co-Chairmen of this working group have agreed to, and detailed arrangements are essentially complete for, a visit of a Soviet delegation to Washington, Alaska, Chicago, the Construction Engineering Research Laboratory (CERL) at Champaign, Illinois, the Cold Regions Research and Engineering Laboratory (CRREL) at Hanover, New Hampshire, the Waterways Experiment Station (WES) at Vicksburg, Mississippi, and New York City during 5-17 October 1976. Purpose of the visit is to reciprocate the US side's visit to Moscow, Tashkent and Leningrad in November 1975 and to continue planning for long-term exchanges of US and Soviet counterpart engineers and scientists to work at each others' home stations for up to three months on specific technical projects and then publish joint monographs on their cooperative work.

Soviet bureaucratic problems appear to us to have been the cause of the extensive (five-month) delays in arranging for the Soviet visit to the US, now planned for 5-17 October 1976. The nine-member Soviet delegation scheduled to visit in October includes none of the Soviet participants in the extensive mutual briefings and negotiations conducted in Moscow in November 1975. It thus seems likely that much of the value of the November 1975

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meeting could be lost and that the US side may have to re-establish a cooperative working relationship with an entirely new group of Soviet representatives. We expect to raise this point with the Soviets as an example of the kind of problem which both sides should work to avoid.

New Towns

With the submission of a 267-page Soviet draft of a publication on standards for new towns site selection and development, considerable progress was made toward a joint publication of a report on new towns which would aid in site selection for new towns in the US. This Soviet paper is the most comprehensive single document prepared by Soviet officials under this agreement and represents a considerable effort by the Soviet side. The Soviets also supplied a copy of their recently completed national standards for new towns and existing towns and provided a book on Methods of Town Reconstruction and one on Town Construction: A Collection of Scientific Works. These are currently being translated for subsequent evaluation.

After months of delay a Soviet team finally came to the US 8-17 September to visit freestanding new towns in Tennessee, Arizona, and Colorado, and the Irvine Ranch in California. The Soviets appeared to find the trip productive and enjoyable, and they seemed particularly interested in our use of space in planning single family housing. The Soviet team was to have arrived in Washington on the 7th. But due to a one-week delay by the Soviet

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Ministry of Foreign Affairs in picking up the visas at our Embassy and delivering them to the Soviet delegation, the team arrived on the 8th in New York, eliminating most of the Washington section of the itinerary. Rescheduling at the last minute was not easy. Private firms, especially in Arizona and Colorado, did an excellent job in hosting the Soviet delegation. US companies have thus far maintained interest in participating in exchanges, largely because of greater Soviet experience in the design and construction of new towns built up around readily available sources of energy.

A US delegation on freestanding new towns is to visit the USSR in October 1976, and the focus will be on new town management, a subject of great interest to the Soviets for reasons not yet clear to us. Regretably, our delegation has been denied access to a coal-based new town we wanted to include on their itinerary.

A US request to visit Naberezhnye Chelny on the Kama River has been turned down twice by the Soviets, perhaps because of scheduling difficulties. However, Naberezhnye Chelny is the center of the huge Kama River construction project; HUD believes there may have been some Soviet sensitivity to having technical-level Government delegations visit the site.

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ENVIRONMENTAL PROTECTION

After stalling the Soviets for several months, in August we officially confirmed the acceptability of the dates November 15-19 for the next Joint Committee meeting in Moscow. At the working level there was the usual drop in significant activities during the quarter, attributed to summer vacations.

Air Pollution

In the stationary sources air pollution control technology area, during July we jointly tested a Soviet wet scrubber system for particulate abatement at Nikopol, USSR. The results indicate that the methodology used and the data obtained are comparable and can be intercalibrated.

In July the Soviets agreed to create a new project on Ferrous Metallurgy Pollution Control Technology (02.01-24), covering both air and water pollution control.

Climate Effects

In our continuing efforts to engage the Soviets on the issue of depletion of stratospheric ozone by fluorocarbons, in July we briefed a visiting Soviet team on US methodology and procedures for measuring and analyzing stratospheric samples.

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Earthquake Prediction

Our earthquake prediction specialists report they have obtained very interesting information on precursor radon anomalies recorded during the May 1976 Gazli earthquake in the USSR. They have also jointly developed with the Soviets data on fault slips as earthquake precursors as well as on earthquake clusters caused by the filling of the reservoir behind the new Soviet dam at Nurek, Tadzhikistan.

Upcoming Events

In preparing for the Joint Committee meeting we have indicated to the Soviets that we intend to drop or scale down several projects and subprojects which offer us insufficient payoff. These include Transportation Source Air Pollution Technology (02.01-31: scale down; the Soviets lag far behind), New Communities in the Far North (02.04-11: possible transfer to the Housing and Other Construction Agreement), Solid Waste Management (02.01-13: scale down; the Soviets lag far behind), Urban Environment in Existing Cities (02.04-14: scale down transportation section, drop sections or noise abatement and land use in which the Soviets show minimal interest).

At the same time, we have indicated interest in new projects on toxic substances and drinking water, but the Soviets have not responded. However, the Soviets have signaled interest in creating new projects on land use and reclamation, environmental education, and the ecology of holarctic mammals. The

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Department of Interior, the US agency responsible for the working area where ^{two of the} / three new projects fall, is enthusiastic about the Soviet land reclamation proposal. Soviet interest in the land reclamation topic reflects the priority they are currently giving to land improvement programs ^{land} in an attempt to increase their agricultural/area. In replying to the Soviets, we will take into account work being pursued under the Soil Science project of the US-USSR Agricultural Agreement.

During the Joint Committee meeting we hope to initial a Convention Concerning Migratory Birds and Their Environment and to hold preliminary discussions on the possibility of a convention for the protection of ice seals, walruses, and perhaps other marine mammals which migrate back and forth across the Bering Sea-Chukchi Sea area. This issue takes on extra significance in view of our plans to extend our jurisdiction (and thereby the provisions of the Marine Mammal Protection Act) out to 200 miles.

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SPACE

The Soviets finally acted positively, a year late, on the earlier agreement to discuss specific prospects for major cooperative space projects to follow ASTP. Representatives of NASA and the USSR Academy of Sciences' Intercosmos Council held a meeting in Washington in October to discuss such possible projects as manned missions involving the US shuttle and Soviet Salyut spacecraft; construction of an international space station; and certain practical applications of space, such as climate prediction, measurements and global search and rescue. Working level activities in all project areas under the Agreement moved forward according to expectations.

Space Biology and Medicine

US specialists participated in a meeting on the final results of the analysis of the experiments flown on the Soviet biological satellite, Cosmos 782. Czechs, Poles, Hungarians, Bulgarians, Romanians, and French also presented final results on their work.

In addition, a working group meeting was held in Yerevan, Armenia during September. The working group confirmed the experiments to be flown on a Soviet biological satellite in the last quarter of 1977, including five from the US, and drew up a list of action items to implement these experiments. Also on the agenda were US and Soviet medical results of ASTP, medical results of Salyut 4, the contribution of bed rest studies toward understanding the physiological effects of weightlessness, and methods of pre-

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dicting man's health state in weightlessness.

In private discussion with the head of the US delegation to the Yerevan Session, the Soviets provided non-public information on the state of health of the two-man crew of the SOYUZ 21 flight, which was aborted early because of technical problems on board.

At both Space Biology and Medicine meetings, the Soviets were frank and professional in their discussions.

With respect to specific interest in accrual of technical benefits to the US, the accommodation of US biological experiments on a Soviet biosatellite next year will give us an opportunity to fly life sciences experiments that we would not otherwise have until the Space Shuttle in 1980.

Natural Environment

US specialists travelled to Kursk to observe ground truth instrumentation and the conditions of a site used for agricultural surveys from space under the Natural environment working Group. During the visit to the Kursk test site, the Soviets provided a tour which was beneficial to the US team. For the first time, the Soviets provided access to their remote sensing hardware permitting the US team to board and to inspect the AN-30 aircraft laboratory. The overall consideration from the trip was that, while the Soviets are behind in development and technique and their civil applications,

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they have necessarily "discovered" the importance of this area of research and are beginning to gear up quite a large effort. The / observations of Soviet capabilities in this area will make the agricultural data to be exchanged more meaningful in the US Large Area Crop Inventory Experiment (LACIE) aimed at world wheat crop prediction. In the future, we hope to have a more detailed visit to the site in about a year to assess progress.

NASA and the Academy of Sciences have confirmed the report of the working group on the Natural Environment written at their meeting in May. The document covers remote sensing applications in the areas of microwave techniques, agriculture, oceanography, and geology.

Space Meteorology--Rockets

A rocket meteorology experiment was conducted during August and September to study diurnal variations under quiet and disturbed geomagnetic conditions. The results of this study will be exchanged with the results of a Soviet study on the same subject at the working group meeting in November.

Full processed data tapes combining both Soviet ground and NASA Applications Technology Satellite (ATS-6) magnetometer data are being prepared and forwarded to the USSR for the data collection period of March-August.

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Space Meteorology--Satellites

In the satellite meteorology area, each side conducted microwave sensing of the atmosphere, using both aircraft and satellite.

Space Science

In the lunar area, NASA has initiated contacts to obtain a surface sample from the Soviet Luna 24 mission for US research, per agreed exchange arrangements. This opportunity was also used to remind the Soviets that the invitation is still open for a Soviet lunar scientist to reciprocate a US visit to a Moscow institute in 1973-1974.

Soviet exchange of data / ^{in all the aforementioned categories} has been adequate (quantity, quality, deadlines) during the third quarter.

Private Sector

While no activities take place between private US firms and Soviet institutions under the Space Agreement, the Soviets did some/^{time} ago approach several US firms for the purchase of equipment used in earth resources survey programs. The digital multispectral scanner approved last year by Commerce for export to the Soviet Hydromet Service was not cleared by COCOM. After subsequent review, Commerce denied the application and the scanner is now on the Munitions List subject to State Department regulation.

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Upcoming Events

A meeting to discuss post-ASTP cooperation was set in Washington, D.C., October 19-22. Also, a meeting of specialists under the Satellite Meteorology Working Group, and of specialists under the Rocket Meteorology Working Group was confirmed respectively for November 9-15 and November 15-22.

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WORLD OCEANS

The Third Quarter saw continued activity in ongoing project areas, but no work was begun on new program initiatives proposed at the Second Joint Committee Meeting in 1975 and at the several working group meetings held last spring. Two of the areas, Air-Sea Interaction and Instrumentation continue to show little progress without guidance from a Joint Working Group and at this stage it seems unlikely that any activity will be generated prior to the Third Joint Committee Meeting. The Fourth Quarter, however, should see a great deal of activity in the Biology, Ocean Dynamics and Geology Working Areas.

Large-Scale Ocean-Atmosphere Interaction

There continues to be no attempt by the Soviets to form a working group in this area or to select a working group co-chairman. Indications are that coordination problems exist between the Soviet Academy of Sciences and the Hydrometeorological Service and these difficulties preclude further action. We believe this matter can best be resolved by the Joint Committee.

The International Southern Ocean Studies--Polar Experiment--South (ISOS-POLEX-S) cooperative activity, involving current and water column measurements ^{the} in/Drake Passage, is the only project which shows progress in this working area. It is an area where bureaucratic responsibility for the carrying forward of the

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activity is clearly established in the USSR (Hydromet), and where both sides already had well-defined programs and found it relatively easy to devise a cooperative program. As recommended during the Second Joint Committee Meeting, a US-USSR Workshop was held in Leningrad the week of July 12 to discuss the cooperative studies in the Southern Ocean. The Soviet delegation was headed by Professor A. F. Treshnikov, the Director of the Arctic and Antarctic Research Institute (AARI). Dr. Worth Nowlin, the Co-Chairman of the ISOS Executive Committee, headed the seven-member US delegation. US and Soviet scientists presented seventeen papers on the 1975 and 1976 field observations of the Antarctic Circumpolar Current (ACC) and the atmospheric and oceanic frontal zones in Drake Passage. These papers were based on data collected during individual expeditions of the US R/Vessels MELVILLE, CONRAD, and THOMPSON and the Soviet R/Vessels PROFESSOR ZUBOV and VIESE.

During the Workshop both sides agreed to continue data exchange, to hold workshops and to conduct cooperative field operations in 1977. Three scientists will spend the month of February aboard a Soviet ship taking hydrographic data in the ACC, south of Australia. Both sides also agreed to ask the Joint Committee to approve the establishment of a Working Sub-Group on the Southern Ocean within the Large-Scale Ocean-Atmosphere Interaction Working Group.

Ocean Currents and Dynamics

Large Scale Dynamics Experiment (POLYMODE)
The three Mid-Ocean issues which have required implementation over the past year were stalled further by Academician Sidorenko's August 2 response to Dr. White's requests of April and July for

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action. Academician Sidorenko suggested in his letter that the exchange of liaison scientists, and the inclusion of other nations in the project be put off until well into 1977. The teletype link will be set up but the timing remains unknown. The leading US POLYMODE scientists, despite their desire to continue with the joint effort are discouraged and have informed their Soviet counterparts that US cooperation will be restrained. Specifically, the US side is not prepared to supply expendable bathythermograph probes (XBTS) to the Soviets unless the three issues in question are agreed to and implemented within the next two or three months.

Other POLYMODE activities during the Third Quarter included two joint planning and theoretical exchanges and a technical inspection of the Soviet Research Vessel VERNADSKY to allow for interface between US instrumentation and VERNADSKY power systems during a fall intercomparison cruise.

Four Soviet scientists spent the first two weeks of July at MIT and Woods Hole Oceanographic Institution (WHOI) working on the Experimental Design Sub Group. Thirteen US scientists spent the month of August in the Crimea at a POLYMODE Theoretical Exchange session. The Soviets had their foremost oceanographers in attendance demonstrating their desire to have the meetings be productive. Academician Brekhovskikh and Professor Monin participated during the entire session. There was an emphasis on formal presentations rather than informal talks which disappointed

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some of the members of the US delegation. Despite the overall formality of the meetings there were opportunities for informal discussions which were most useful. A joint publication of the proceedings is now in preparation. The numerical modelling aspects of POLYMODE were discussed in detail, and Professor Monin has directed that his scientists prepare a detailed paper on the types of POLYMODE data necessary to upgrade and refine the numerical models.

A portion of these meetings were held aboard the Research Vessel VERNADSKY during a four-day cruise in the Black Sea, and it was during this cruise that a MIT/WHOI technician was aboard to inspect the vessel in preparation for a joint instrumentation intercomparison which took place in October in the North Atlantic.

In the Numerical Modelling project area, as a follow-up to Professor Sarkisyan's three-month visit to NOAA's Geophysical Fluid Dynamics Laboratory (GFDL), Professor Monin, Director of the Soviet Institute of Oceanology, has invited a GFDL scientist to the Novosibirsk computer facility. We are proposing that the visit take place in May 1977.

Geology, Geophysics and Geochemistry

A Soviet geologist participated in the 49th Cruise Leg of the Deep Sea Drilling Project in the North Atlantic during July and August. At the 25th International Geological Congress in Sydney, Australia, during August, Dr. Rona of NOAA met with the Soviet

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delegation to discuss the progress on the Joint US/USSR Trans Atlantic Geotraverse (TAG) Geophysical Atlas. A preview display was made at the Congress of the contents of this Atlas. Dr. Rona assured the Soviets that the US input would be prepared by the end of 1976. The Soviets on the other hand were non-committal, but felt that their data preparation is moving along well.

The marine geophysics of the Aleutian Kamchatka area will be investigated this fall by the US research vessels CONRAD and VEMA. A Soviet research vessel may participate in this field effort.

No activity occurred in the new project areas of Sediment Dynamics or Inhomogeneity of the Earth's Crust.

Biological Productivity and Biochemistry

There were two joint cruises during the quarter. US scientists participated in an investigation of a Gulf Stream ring aboard the Soviet Research Vessel BELOGORSK in September. In August US scientists were aboard the Soviet ship KHRONOMETR for hydroacoustic investigations of fish populations off the Canary Islands.

Dr. Edwards of NOAA's Woods Hole National Marine Fisheries Center met with Dr. Byolov to discuss plans for the November Workshop on Bioproductive Systems of the North Atlantic. This workshop will be held at the Woods Hole facility.

A variety of workshops and symposiums will be taking place in the Fourth Quarter and will, hopefully, produce useful results

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in the form of joint publications.

Intercalibration and Standardization

There continues to be no progress in this working area. The Soviets did respond in late July to our May query./ Dr. Yastrebov has been chosen as the new Co-Chairman of the Instrumentation Working Group replacing Dr. Igor Mikhaltsev. The Soviets also indicated in their July response that their review of the US Salinity and Temperature Standard Proposal is complete and the materials will be sent soon. Nothing has been received to date.

Dr. V. Shirey also suggested in this same cable that an October Working Group Meeting be scheduled in the Soviet Union.

A cable was forwarded to the Soviets on September 11, proposing that salinity samples be exchanged immediately in order that the appropriate test be completed before a joint working group meeting is scheduled. There has been no response through the Third Quarter.

Upcoming Events

Scheduling of the Third Joint Committee Meeting for late in the Fourth Quarter or early in 1977 continues to be a major item for review, but further planning awaits a Soviet response to our proposal.

The Geology, Ocean Dynamics, and Biology Working Group areas will continue to see activity over the rest of 1976 and well into 1977, while other areas show limited or no progress.

December 17, 1976

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