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Binational Science Program Gathers Momentum

If past performance is a reliable indicator of future accomplishments, 1971 should be a year of accelerated progress for the U.S.-China Cooperative Science Program initiated in 1969 under a binational agreement. Already under negotiation between the National Science Council and the U.S. National Science Foundation are several projects of great interest to the science community of both nations. Proposed as cooperative research projects, the topics under discussion include:

1. Oceanography—marine geology
2. Anti-cancer property of medicinal plants
3. Environmental engineering
4. Fish and bird ecology
5. Biological control of pests
6. Geothermal resources
7. Copper mining
8. Ferros metallurgy.

During the past year, three cooperative research projects have either been completed or initiated. These projects are: (a) propagation of the grey mullet-a six-week project done by Dr. Ziad H. Schehadeh of the Oceanic Institute, Hawaii, and Dr. I. C. Liao of the Taiwan Fisheries Research Institute, (b) Studies on the optimum use of limited supplies of protein in human populations—a one-year project undertaken by Dr. Bacon F. Chow of the School of Hygiene and Public Health of the Johns Hopkins University, and Dr. Ping-shi Yu of the Taiwan Provincial Women and Children Hospital, and (c) The Cellular Response and Neoplasia of the Cervix Uteri in Humans—a year-long project undertaken by Dr. James P. S. Yang of the University of Washington and Dr. W. T. Chiang of the Medical School, National Taiwan University.

The past year also witnessed the arrival in Taiwan thirty-six scientists from the United States, inclding two Nobel laureats, as short-term visiting scientists and seven others as long-term visitors, excluding one scientist who is scheduled to arrive in January.

Scientists who came as short-term visitors are the following:

Dr. Bruce Crawford—University of Minnesota—Physical Chemistry—the Chemistry Research Center at National Taiwan University—July 7-10, 1969.

Dr. Robert E. Marshak—University of Rochester — Physics and Astronomy—Physics Research Center at National Tsinghua University —July 14-15, 1969.

Dr. Stanley H. Bennett—University of Chicago—Anatomy and Biophysics—College of Medicine of National Taiwan University and National Defence Medical Center—July 20-23, 1969.

Dr. John Ide—Institute of Electronics and Electronics Engineering —Physics and Communication Engineering—the Engineering Science Research Center at Taiwan Provincial Cheng Kung University—July 20-24, 1969.

Dr. Harry C. Kelly—North Carolina State University—Physics —Physics Research Center at National Tsinghua University—July 21-22, 1969.

Dr. Ernest S. Kuh—College of Engineering, University of California, Berkeley — Electronics Engineering —the Department of Electronical Engineering, National Taiwan University—December 22-24, 1969.

Ellis R. Kolchin—the Department of Mathematics of Columbia University — Mathematics — the Mathematics Research Center at National Taiwan University—April 11-15, 1970.

Dr. Morton Smutz—College of Engineering, University of Florida—Chemical Engineering—the Union Industrial Research Institute — August 12-22, 1970.

Dr. Arthur N.L. Chiu—Department of Civil Engineering, University of Hawaii—Civil Engineering—College of Engineering of National Taiwan University — May 16-19, 1970.

Dr. Henry Van Der Schalie—the Museum of Zoology at the University of Michigan—Zoology and Curator of Mollusks—the College of Medicine of National Taiwan University and National Defence Medical Center—March 2-5, 1970.

Dr. Curt R. Schneider—University of Michigan —Epidemiology—the College of Medicine of National Taiwan University and National Defence Medical Center—March 2-5, 1970.

Dr. Chien Fan—University of Alabama — Mechanical Engineering —the College of Engineering of National Taiwan University—July 18—August 15, 1970.

Dr. Peter Hobbs—Department of Atmospheric Sciences at the University of Washington—Cloud Physics—the Georgraphic Department of National Taiwan University—March 21-25, 1970.

Dr. Jerry Becker—Rutgers University — Mathematics Education —the Mathematics Department of National Taiwan Normal University—June 21-25, 1970.

Dr. King-sun Fu—the School of Electrical Engineering of Purdue University — Electrical Engineering Department of National Taiwan University—August 24—September 4, 1970.

Dr. S. C. Wang—Department of Pharmacology, College of Physicians and Surgeons, Columbia University —Pharmacology—National Defence Medical Center—July 25—August 25, 1970.

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Dr. Robert Y. Hsu—Department of Biochemistry, College of Medicine of the State University of New York —Biochemistry — the Biochemistry Department of National Taiwan University Medical College and National Defence Medical Center—July 15-25, 1970.

Dr. Paul P. Wang—Department of Electrical Engineering, Duke University—Electrical Engineering—the Electrical Engineering Department of National Taiwan University—August 3—September 2, 1970.

Dr. I. E. Wallen—Office of Environmental Sciences, Smithsonian Institution—Oceanography—the Institute of Oceanography of National Taiwan University—April 28—May 1, 1970.

Dr. Ruey-wen Liu—Department of Electrical Engineering of Notre Dame University—Electrical Engineering—Department of Electrical Engineering of National Taiwan University—August 16-29, 1970.

Dr. Charles Vossler—University of Chicago—Physics—the Physics Research Center at National Tsinghua University—June 15-28, 1970.

Dr. Arthur C. Stern—Department of Environmental Sciences and Lngineering of the University of North Carolina at Chapel Hill—Air Pollution—the Institute of Environmental Sanitation—August 18-25, 1970.

Dr. Y. R. Shen—Department of Physcics, University of California, Berkeley—Physics—National Tsinghua University and National Taiwan University—August 26—September 5, 1970.

Dr. Jin Wu—Hydronautics, Incorporated, Research in Hydrodynamics—Hydraulics—College of Engineering, National Taiwan University —August 9—September 6, 1970.

Dr. Julian Schwinger—Department of Physics, Harvard University —Physics—Physics Research Center at National Tsinghua University and National Taiwan University—August 3-12, 1970.

Dr. Arnold Strassenburg—American Institute of Physics, State University of New York at Stony Brook —Physics—Physics Research Center at National Tsinghua University—July 11-15, 1970.

Dr. G. W. Brindley—Department of Geochemistry and Mineralogy, The Pennsylvania State University—Geochemistry and Mineralogy — the Mining Research and Service Organization, Ministry of Economic Affairs —August 14-26, 1970.

Dr. Mary Warga — American Optics Society — Physics — Taiwan Provincial Cheng Kung University, Taiwan Aluminum Corporation and the Union Industrial Research Institute—August 31—September 6, 1970.

Dr. Tien Sun Chang—Department of Engineering Mechanics of the University of North Carolina—Theoretical Physics — the Mathematics Research Center both at the National Taiwan University and Academia Sinica—September 9-15, 1970.

Dr. Robert J. Collins—Department of Electrical Engineering, University of Minnesota—Physics—National Tsinghua University — September 21-25, 1970.

Dr. Nicolaas Bloembergen — Gordon McKay Professor of Applied Physics, Harvard University—Applied Physics — Physics Research Center at National Tsinghua University—September 2-6, 1970.

Dr. Ya Hsueh—Department of Oceanography, Florida State University—Geophysical Fluid Dynamics—the Institute of Oceanography of National Taiwan University—August 31—September 11, 1970.

Dr. S. F. Tuan—Department of Physics and Astronomy at the University of Hawaii — Physics — Dec 25, 1970—Jan. 24, 1971—National Tsinghua University.

Dr. Shang Fa Yang—College of Agriculture, University of California of Davis—Biosynthesis and Biochemical—College of Agriculture, National Taiwan University—Dec. 15, 1970—Jan. 25, 1971.

Dr. Bodie E. Douglas—Department of Chemistry at the University of Pattsburgh—Chemistry—National Tsinghua University — Nov. 13-18, 1970.

The long-term visiting scientists are:

D. C. S. Wu—Institute for Fluid Dynamics and Applied Mathematics, University of Maryland—Physics—National Taiwan University—Nov. 21—Dec. 4, 1970.

Dr. Philip G. Miles—State University of New York at Buffalo—Biology—the Botany Institute, Academia Sinica and the Botany Department of National Taiwan University —July 18, 1970 through July 17, 1971.

Dr. Wu-yi Haiang—University of California, Berkeley — Mathematics, the Mathematics Research Center at National Taiwan University — September, 1, 1970 through February 28, 1971.

Dr. Chin Chen—Columbia University—Geology—the Institute of Oceanography, National Taiwan University — September 1, 1970 through June 30, 1971.

Dr. Marshall M. Lih — the Catholic University of America—Chemical and Biomedical Engineering—the Chemical Engineering Department of the National Taiwan University — September 1, 1970 through August 31, 1971.

Dr. Lan Jen Chu—Massachusetts Institute of Technology—Electrical Engineering—National Chiao Tung University—July 1, 1970 through 36 months of which 18 months will be spent at the host organization in Taiwan.

Dr. Bede Liu—Princeton University — Electrical Engineering — the Electrical Engineering Department of the National Taiwan University—September 1, 1970 through February 28, 1971.

Dr. Hsun-tiao Yang—University of California—Applied Mathematics —the Department of Applied Mathematics of Chung Hsing University—September 16, 1970 through September 15, 1971.

Two Chinese scientists went to the United States under the visiting scientists program in 1970. They are:

Dr.Ta-cheng Tung—Department of Biochemistry, College of Medicine of National Taiwan University—Biochemistry—Massachusetts Institute of Technology and the National Cancer Institute of NIH—May 25—June 10, 1970.

Mr. Shau-yau Ho—Department of Physics of National Taiwan University—Physics—Astronomy Research Facility, University of Massachusetts —September 1, 19970 through July 31, 1972.

Students May Bring Dependents Overseas After One-Yr. Stay

Chinese students pursuing studies at foreign institutions may bring their dependents overseas after having stayed abroad for one year instead of two, the Ministry of Education announced in late December.

In making the announcement, the MOE said those who are financially adequate to support a family abroad may ask for a certificate from the nearby Chinese diplomatic or consular mission. With the certificate thus furnished, the applicant may approach the MOE's Bureau of International Culture and Educational Relations for exit permission for his dependents.

MOE said the term "dependents" applies to the applicant's parents, spouse, and children under 18.

Miles Lectures on Study of Morphogenesis in Fungi

Dr. Philip G. Miles, a biologist from the State University of New York at Buffalo, delivered a lecture last month on "The Use of Modifier Mutations in the Study of Morphogenesis in Fungi" in Taipei. A long-term visiting scientist under the China-U.S. Cooperative Science Program, Dr. Miles is here on a one-year tour working at the Institute of Botany, Academia Sinica, and the Botany Department of National Taiwan University. The Miles lecture is boiled down as follows:

Morphogensis is that sub-division of biological science which deals with studies of the origin of form. In morphogenesis an experimental approach always supplements descriptive studies. Many fungi, including members of the higher fungi such as *Neurospora Crassa* and *Schizophyllum commune*, are particularly well suited for morphogenetic investigations since they can be grown under controlled environmental and nutritional conditions, have a short life cycle, produce a large number of progeny for genetic analyses, and have a relatively simple morphology.

In the present studies morphological mutants are being used to study hyphal morphogenesis. In particular, modifier genes (i.e. a gene which changes or modifies the activity of a gene at another locus) of the morphological mutants are being employed since they partition or divide the development of hyphase to an expression somewhere between the mutant form and the wild-type phenotype and thus permit developmental processes to be examined in greater detail.

The ultimate objective of these studies of the morphological mutants of *Schizophyllum* is to obtain an understanding of the biochemical events, under genetic control, which underlie the developmental changes occurring during hpyhal growth.

Picture below shows Dr. Miles lecturing.

Peiping Watchers in ROC, U.S. Exchange Views

More than 100 Chinese and American scholars met in Taipei last month for the First Conference on Mainland China to promote closer academic cooperation in the hope than exchange of opinions and research findings will contribute to the better understanding of the Communist-ruled mainland China.

The symposium on Chinese Communist studies covered a wide range of subjects during the five-day meeting, including matters of both before and after the Communist occupation of the Chinese mainland.

The Conference was sponsored by the Institute of International Relations of the Republic of China. Co-sponsors were Institute of East Asian Studies, National Chengchi University; Joint Council on Sino-American Cooperation in the Humanities and Social Sciences, Academia Sinica; Institute of Chinese Mainland Problems, Republic of China, The Hoover Institution on War, Revolution and Peace at Stanford University; Institute of International Studies, University of South Carolina; Center of Asian Studies, St. John's University, New York City.

Dr. Arther F. Findeis, staff associate of the Tokyo office of the U.S. National Scinece Foundation, will visit Taiwan January 11-15. It will be his second visit to Taiwan. Last October he was in Taipei with Dr. Henry Birnbaum, USF resident representative in Tokyo, for a meeting with officials of the National Science Council on the China-U.S. Cooperative Science Program.

Billings Stresses Importance of Creativity in Economic Growth

(The followins is a comment on the role of the Tele-communications Laboratories of the Ministry of Communications by Dr. Bruce H. Billings, special assistant for science and technology to the American ambassador to China. Dr. Billings knows what he is talking about because he has frequently worked with the Bell Telephone Laboratories.—Ed.)

A telephone company has requirements for development which cover every conceivable branch of science. Electronic systems require amplifiers, cables, recorders, television receivers, transmitters, microwave systems and the entire gamut of electronic devices. All of these have been improved by work in the Bell System Laboratories. The laboratories have contributed to washing machine development, to research in plastic molding and weather-resistant fabrics. The Bell Laboratories' chemical developments have been quite spectacular. In essentially every case, the inventions that have flowed from these laboratories have been manufactured and used in quantity by the telephone company itself. Almost by accident, every one of these inventions is also exciting and useful in other industries as well as in the consumer market for devices other than the telephones. It would be a difficult task to say how many of the things we see and use in the United States have much of their origins in the telephone laboratories. Your laboratories here will have the opportunity to play a similar role not only in the Republic of China but in the whole world.

There is a myth which I find prevalent among graduate students and scientists both in the United States and China. This myth says essentially that modern invention can only taken place with a team effort of highly trained and distinguished scientists. Innovation is considered not to be possible except in the most sophisticated areas. Of course there are inventions which are made in the highly sophisticated context of semiconductor technology and computer science. The opportunity for simple inventions is however just as great today as it was a hundred years ago. The best economic growth I believe takes place when a country can market products which are the result of its own creative ingenuity rather than the result of a low labor rate. Recent statistics show that the only part of the United States' export trade which enjoys a favorable trade balance is the product of the so-called science based industry where creativity and innovation are responsible for the existence of the companies involved.

I think the telephone laboratories here in the Republic of China are already capable of constributing in an innovative sense to the economy of this country. There is, however, a major hurdle to be overcome if maximum creativity and innovation is to be achieved. This had to do with the availability of modern components. I strongly believe that the day has passed when every country should produce all the components needed in a modern system. The world has shrunk so rapidly that far too few people are aware of its present small size. One of the advantages of being in the United States which produces almost everything is the ability to pick up the telephone in Boston, order a component in Los Angeles and have it delivered the next day. No single company in the United States would dream of trying to make all the semi-conductors, connectors, vacuum tubes, electric motors, etc. that it needs in developing a new piece of equipment. Today, laboratories here in Taiwan in theory can also pick up a telephone, call Boston and in two days have the missing piece. In practice, because this is a separate country with its own laws and regulations this is almost impossible except in a few rare cases. This means that the potential inventor in this country and in fact in many countries cannot take advantage of the latest technology even though it may be indeed a simple technology. Scientific invention is international and the opportunities in this area are enormous. To make the tools available is of tremendous importance for these laboratories and the other laboratories in Taiwan. The economic problem faced by the government in making such truly rapid movement of components possible and hopefully making the cost of these components as low as possible is going to be extremely difficult. The implications of science in politics are not well understood in any country. I believe that the government of the Republic of China has the opportunity to become a world leader with respect to its understanding of this role.

Front view of the newly completed main building of the Telecommunications Laboratories located at Chungli, Taoyuan.